

## EAST Search History

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	1353872	secondary rechargeable lithium	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2006/05/18 12:01
L2	112800	1 near3 (battery batteries electrochemical)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2006/05/18 12:02
L3	101	2 and (oxygen same (ceria zirconia yttria))	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2006/05/18 12:12
L4	13	("3655845"   "3707589"   "4263381"   "4294898"   "4358516"   "5137853"   "5415127").PN. OR ("6117807").URPN.	US-PGPUB; USPAT; USOCR	OR	OFF	2006/05/18 12:09
L5	64	lithium with oxygen with conducting	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2006/05/18 12:10
L6	94	lithium with (oxygen near7 conduct\$4)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2006/05/18 12:10
L7	530	2 and (oxygen with conduct\$4 with (electrode\$1 anode\$1 cathode\$1))	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2006/05/18 12:15
L8	400	7 and ("429"/\$.ccls. h01m\$.ipc.)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2006/05/18 12:13
L9	58	7 and ("429"/\$.ccls. h01m\$.ipc.)	EPO; JPO; DERWENT	OR	OFF	2006/05/18 12:14
L10	68	2 and ((oxygen near2 ion\$1) with conduct\$4 with (electrode\$1 anode\$1 cathode\$1))	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2006/05/18 12:15
L11	13	10 not (fuel adj cell\$1)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT	OR	OFF	2006/05/18 12:16
L12	1	2004-360606.NRAN.	DERWENT	OR	OFF	2006/05/18 12:16

## EAST Search History

L13	2	(US-6117807-\$).did. or (JP-2004127678-\$). did.	USPAT; JPO	OR	OFF	2006/05/18 12:16
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**Banks, Kendra**

190509

**From:** GREGG CANTELMO [gregg.cantelmo@uspto.gov]  
**Sent:** Thursday, May 18, 2006 12:08 PM  
**To:** STIC-EIC1700  
**Subject:** Database Search Request, Serial Number: 10/670484

**Requester:**  
GREGG CANTELMO (P/1745)  
**Art Unit:**  
GROUP ART UNIT 1745  
**Employee Number:**  
75777  
**Office Location:**  
REM 06C81  
**Phone Number:**  
(571) 272-1283  
**Mailbox Number:**  
REM 6C81

**SCIENTIFIC REFERENCE BR**  
Sci & Tech Inf. Cntr

**MAY 18**

**Pat. & T.M. Office**

**Case serial number:**  
10/670484  
**Class / Subclass(es):**  
429/218.1, 232  
**Earliest Priority Filing Date:**  
9/26/03  
**Format preferred for results:**  
Paper

**Search Topic Information:**

Please search the claimed and disclosed electrode material for a secondary battery, notably lithium class. See paragraph [0054] of the corresponding PG PUB document which lists the genus of mixed oxygen ion and electron conductors (US PG PUB 2004/0157123).

Please be sure to exclude fuel cells from the search.  
**Special Instructions and Other Comments:**

=> file reg

FILE 'REGISTRY'

USE IS SUBJECT TO THE TERMS OF YOUR STN CUSTOMER AGREEMENT.

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=> display history full ll-

FILE 'HCAPLUS'

L1 55341 SEA SASAKI ?/AU  
L2 37659 SEA TAKEUCHI ?/AU  
L3 29822 SEA NAKANO ?/AU  
L4 103098 SEA KOBAYASHI ?/AU  
L5 246 SEA UKYO ?/AU  
L6 16 SEA L1 AND L2 AND L3 AND L4 AND L5  
SEL L6 1-16 RN

FILE 'REGISTRY'

L7 30 SEA (193214-24-3/BI OR 7782-42-5/BI OR 193214-22-1/BI OR  
L8 1 SEA L7 AND CE/ELS

FILE 'HCA'

L9 6 SEA L8  
L10 220389 SEA BATTERY OR BATTERIES OR (ELECTROCHEM? OR ELECTROLY?  
OR GALVANI? OR WET OR DRY OR PRIMARY OR SECONDARY) (2A) (CE  
LL OR CELLS) OR DRYCELL? OR WETCELL?  
L11 56374 SEA FUELCELL? OR FUEL?(2A) (CELL OR CELLS)  
L12 1 SEA L9 AND L10  
L13 1 SEA L9 AND (52 OR 72)/SC,SX

FILE 'REGISTRY'

L14 2333 SEA (CE(L)ZR(L)O)/ELS  
L15 149 SEA L14 (L) 3/ELC.SUB  
E CERIA/CN  
L16 1 SEA CERIA/CN  
E ZIRCONIA/CN  
L17 1 SEA ZIRCONIA/CN  
L18 279 SEA CEO2  
L19 997 SEA O2ZR OR OZR  
L20 8 SEA L18 AND L19

FILE 'HCA'

L21 1566 SEA L15  
L22 32509 SEA L16 OR CERIA# OR CEO2 OR (CERIUM# OR CE) (W) (OXIDE#  
OR DIOXIDE#)  
L23 132160 SEA L17 OR ZIRCONIA# OR ZRO OR ZRO2 OR (ZIRCONIUM# OR  
ZR) (W) (OXIDE# OR DIOXIDE# OR MONOXIDE#)

L24 8 SEA L20  
L25 1 SEA L24 AND L10  
L26 1 SEA L25 AND (52 OR 72)/SC,SX  
L27 25 SEA L21 AND L10  
L28 4 SEA L27 NOT L11  
L29 103 SEA L21 AND (52 OR 72)/SC,SX  
L30 43 SEA L29 NOT L11  
L31 11441 SEA L22 AND L23  
L32 611 SEA L31 AND L10  
L33 131 SEA L32 NOT L11  
L34 22978 SEA L16  
L35 91033 SEA L17  
L36 99 SEA L33 AND L34  
L37 111 SEA L33 AND L35  
L38 90 SEA L36 AND L37  
L39 13858 SEA ELECTRON#(2A) (OXYGEN# OR O2 OR O)  
L40 567 SEA (INTERCALAT? OR DECALAT?) (3A) (OXYGEN# OR O2 OR O)

## FILE 'REGISTRY'

L41 1 SEA 64417-98-7

## FILE 'HCA'

L42 4714 SEA L41  
L43 7 SEA L38 AND L42  
L44 0 SEA L38 AND L39  
L45 0 SEA L38 AND L40  
L46 1 SEA L27 AND L39  
L47 1 SEA L27 AND L40  
L48 1 SEA L30 AND L39  
L49 2 SEA L30 AND L40  
L50 5 SEA L32 AND L39  
L51 0 SEA L32 AND L40  
L52 29 SEA L31 AND L39  
L53 0 SEA L31 AND L40  
L54 22 SEA L52 NOT L11  
L55 18 SEA L12 OR L13 OR L25 OR L26 OR L28 OR L43 OR L46 OR L47  
OR L48 OR L49 OR L50  
L56 83 SEA (L27 OR L30 OR L54) NOT L55  
L57 17 SEA L55 AND 1840-2003/PRY,PY  
L58 62 SEA L56 AND 1840-2003/PRY,PY

=> file hca

FILE 'HCA'

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=> d 157 1-17 cbib abs hitstr hitind

L57 ANSWER 1 OF 17 HCA COPYRIGHT 2006 ACS on STN

142:272921 Electrochemical sensor. Grant, Robert Bruce (The BOC Group PLC, UK). PCT Int. Appl. WO 2005019817 A1 20050303, 31 pp.

DESIGNATED STATES: W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW; RW: AT, BE, BF, BJ, CF, CG, CH, CI, CM, CY, DE, DK, ES, FI, FR, GA, GB, GR, IE, IT, LU, MC, ML, MR, NE, NL, PT, SE, SN, TD, TG, TR.

(English). CODEN: PIXXD2. APPLICATION: WO 2004-GB3370 20040805.

PRIORITY: GB 2003-19455 20030819.

AB An org. contaminant mol. sensor is described for use in a low oxygen concn. monitored environment. The sensor comprises an

**electrochem. cell**, which is formed from a measurement electrode coated with (or formed from) a catalyst having the ability to catalyze the dissociative adsorption of the org. contaminant mol., the electrode being positioned for exposure to the monitored environment, a ref. electrode coated with (or comprised from) a catalyst selected for its ability to catalyze the dissocn. of oxygen to oxygen anions, the ref. electrode being positioned within a ref. environment, and a solid state oxygen anion conductor disposed between and bridging the measurement and ref. electrodes, wherein oxygen anion conduction occurs at or above a crit. temp.,  $T_c$ . Sealing means are provided for sepg. the ref. environment from the monitored environment. Means are also provided for controlling and monitoring the temp. of the cell, and for controlling the elec. current ( $I_p$ ) flowing between the ref. and measurement electrodes. At temps. ( $T_{ads}$ ) below  $T_c$ , org. contaminant mols. are adsorbed onto and dissocd. at the surface of the measurement electrode leading to the build up of carbonaceous deposits at the surface thereof. At temps. ( $T_{tit}$ ) above  $T_c$ , an elec. current ( $I_p$ ) is passed between the ref. and measurement electrode thereby to control the no. of oxygen anions passing from the ref. electrode to the measurement electrode to oxidize the carbonaceous deposits formed at the surface thereof and the formation of carbon dioxide.

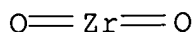
IT **1314-23-4D, Zirconia**, yttria-stabilized

**64417-98-7, Yttrium zirconium oxide**

(org. contaminant detn. in low oxygen concn. monitored environment by electrochem. gas sensor system)

RN 1314-23-4 HCA

CN Zirconium oxide ( $ZrO_2$ ) (8CI, 9CI) (CA INDEX NAME)



RN 64417-98-7 HCA

CN Yttrium zirconium oxide (9CI) (CA INDEX NAME)

\*\*\* STRUCTURE DIAGRAM IS NOT AVAILABLE \*\*\*

IT **1306-38-3D, Ceria**, gadolinium doped  
(solid state oxygen anion conductor; org. contaminant detn. in  
low oxygen concn. monitored environment by electrochem. gas  
sensor system)

RN 1306-38-3 HCA

CN Cerium oxide (CeO<sub>2</sub>) (8CI, 9CI) (CA INDEX NAME)



IC ICM G01N033-00

ICS G01N027-406; G01N027-407

CC 80-2 (Organic Analytical Chemistry)

IT Contamination (electronics)

Decomposition catalysts

**Electrochemical cells**

Electrodes

Heaters

Ionic conductors

Thermocouples

(org. contaminant detn. in low oxygen concn. monitored  
environment by electrochem. gas sensor system)

IT 1314-08-5, Palladium oxide (PdO) **1314-23-4D, Zirconia**, yttria-stabilized 1314-36-9D, Yttria, **zirconia** stabilized by 1317-38-0, Cupric oxide, uses 1317-39-1, Cuprous oxide, uses 7439-88-5, Iridium, uses 7440-04-2, Osmium, uses 7440-05-3, Palladium, uses 7440-06-4, Platinum, uses 7440-15-5, Rhenium, uses 7440-16-6, Rhodium, uses 7440-18-8, Ruthenium, uses 7440-22-4, Silver, uses 7440-50-8, Copper, uses 7440-57-5, Gold, uses **64417-98-7, Yttrium zirconium oxide**

(org. contaminant detn. in low oxygen concn. monitored  
environment by electrochem. gas sensor system)

IT 7440-54-2D, Gadolinium, doped **ceria**

(org. contaminant detn. in low oxygen concn. monitored  
environment by electrochem. gas sensor system)

IT **1306-38-3D, Ceria**, gadolinium doped  
(solid state oxygen anion conductor; org. contaminant detn. in  
low oxygen concn. monitored environment by electrochem. gas  
sensor system)

L57 ANSWER 2 OF 17 HCA COPYRIGHT 2006 ACS on STN

140:360277 Secondary **battery**. Sasaki, Iwao; Takeuchi, Yoji; Nakano, Hideyuki; Kobayashi, Tetsuro; Ukyo, Yoshio (Toyota Central Research and Development Laboratories, Inc., Japan). Jpn. Kokai Tokkyo Koho JP 2004127678 A2 20040422, 13 pp. (Japanese). CODEN: JKXXAF. APPLICATION: JP 2002-289128 20021001.

AB The **battery** has a cathode and an anode, both comprising a solid active mass, and an electrolyte layer between the 2 electrodes; where the cathode and/or the anode solid active mass comprises an **electron-O** ion mixed conductor capable of **intercalating** and **decalating** O ion or O.

IT **609337-34-0**, Cerium zirconium oxide (Ce<sub>2</sub>Zr<sub>2</sub>O<sub>7.5</sub>) (electrodes contg. **electron-oxygen** ion mixed conductors for secondary **batteries**)

RN 609337-34-0 HCA

CN Cerium zirconium oxide (Ce<sub>2</sub>Zr<sub>2</sub>O<sub>7.5</sub>) (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
=====	=====	=====
O	7.5	17778-80-2
Zr	2	7440-67-7
Ce	2	7440-45-1

IC ICM H01M004-02

ICS H01M004-58; H01M010-40

CC **52-2** (Electrochemical, Radiational, and Thermal Energy Technology)

ST secondary **battery** electrode active mass; electrode active mass **electron oxygen** ion mixed conductor

IT **Battery** electrodes

Secondary **batteries**

(electrodes contg. **electron-oxygen** ion mixed conductors for secondary **batteries**)

IT 7440-06-4, Platinum black, uses 64417-98-7, Yttrium zirconium oxide **609337-34-0**, Cerium zirconium oxide (Ce<sub>2</sub>Zr<sub>2</sub>O<sub>7.5</sub>)

(electrodes contg. **electron-oxygen** ion mixed conductors for secondary **batteries**)

L57 ANSWER 3 OF 17 HCA COPYRIGHT 2006 ACS on STN

140:257304 Thermodynamic stability of metastable tetragonal t'-Ce<sub>0.5</sub>Zr<sub>0.5</sub>O<sub>2</sub> phase in the CeO<sub>2</sub>-ZrO<sub>2</sub> system. Yao-matsuo, Shinya Otsuka; Yao, Takayuki; Omata, Takahisa (Department of Materials Science and Processing, Graduate School of Engineering, Osaka University, Suita, 565-0871, Japan). High Temperature Materials and Processes (London, United Kingdom), 22(3-4), 157-164 (English) **2003**. CODEN: HTMPEF. ISSN: 0334-6455. Publisher: Freund

FRPR  
of  
Inst.  
App



Publishing House Ltd..

AB According to the XRD anal. and emf. measurements employing a solid **electrochem. cell**, we have compared the thermodyn. stabilities of metastable  $t'$ -Ce<sub>0.5</sub>Zr<sub>0.5</sub>O<sub>2</sub> phase, ZrO<sub>2</sub>-based monoclinic and CeO<sub>2</sub>-based cubic phases (m+c) mixt., and ZrO<sub>2</sub>-based tetragonal and CeO<sub>2</sub>-based cubic phases (t+c) mixt. The present expts. have confirmed that the  $t'$  phase is metastable at higher temps. than 1373 K, and the stable state is (t+c) mixt. The  $t'$  phase is metastable at lower temps. than 1173 K, and the stable state is (m+c) mixt. These results are consistent with the equil. phase diagram of CeO<sub>2</sub>-ZrO<sub>2</sub> system. According to the emf. measurements, it was found that the thermodyn. stability of the  $t'$  phase lies between those of (t+c) and (m+c) at lower temps. than 1173 K. It was concluded that the  $t'$  phase is metastable, but its thermodyn. stability is close to those of (t+c) and (m+c).

IT **65453-23-8**, Cerium zirconium oxide  
(mixed phases; thermodyn. stability of metastable tetragonal  $t'$ -Ce<sub>0.5</sub>Zr<sub>0.5</sub>O<sub>2</sub> phase in CeO<sub>2</sub>-ZrO<sub>2</sub> system)

RN 65453-23-8 HCA

CN Cerium zirconium oxide (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
=====	=====	=====
O	x	17778-80-2
Zr	x	7440-67-7
Ce	x	7440-45-1

IT **53169-24-7**, Cerium zirconium oxide (Ce<sub>0.5</sub>Zr<sub>0.5</sub>O<sub>2</sub>)  
(tetragonal phase; thermodyn. stability of metastable tetragonal  $t'$ -Ce<sub>0.5</sub>Zr<sub>0.5</sub>O<sub>2</sub> phase in CeO<sub>2</sub>-ZrO<sub>2</sub> system)

RN 53169-24-7 HCA

CN Cerium zirconium oxide (CeZrO<sub>4</sub>) (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
=====	=====	=====
O	4	17778-80-2
Zr	1	7440-67-7
Ce	1	7440-45-1

CC 57-2 (Ceramics)

Section cross-reference(s): 68, 69

IT **65453-23-8**, Cerium zirconium oxide  
(mixed phases; thermodyn. stability of metastable tetragonal  $t'$ -Ce<sub>0.5</sub>Zr<sub>0.5</sub>O<sub>2</sub> phase in CeO<sub>2</sub>-ZrO<sub>2</sub> system)

IT **53169-24-7**, Cerium zirconium oxide (Ce<sub>0.5</sub>Zr<sub>0.5</sub>O<sub>2</sub>)  
(tetragonal phase; thermodyn. stability of metastable tetragonal

t'-Ce<sub>0.5</sub>Zr<sub>0.5</sub>O<sub>2</sub> phase in CeO<sub>2</sub>-ZrO<sub>2</sub> system)

L57 ANSWER 4 OF 17 HCA COPYRIGHT 2006 ACS on STN

140:95274 Nanoscale carbon-containing dispersions and their polymerizable compositions, moldings, and manufacture. Shimoyama, Tadashi; Yokota, Hiroshi; Takeda, Kazunori; Fujiwara, Kunio; Takato, Chikako (Ebara Corp., Japan). Jpn. Kokai Tokkyo Koho JP 2004018754 A2 20040122, 13 pp. (Japanese). CODEN: JKXXAF. APPLICATION: JP 2002-178067 20020619.

AB Nanoscale C materials, which may have been dispersed or suspended in solvents upon radiation irradiation, and polymerizable materials are irradiated with radiation to give compounds. compound. unpolymers, subjected to be supported on or adhered to substrates, and polymerized by irradiating radiation to give nanoscale C-compound. macromolecule. compounds on the substrates. Thus, a THF solution of 1 g C nanotube was mixed with 50 g THF solution of acrylic acid and irradiated with 10 kG/h .gamma.-ray for 5 h. When the viscosity of the solvent reached 1 Pa-s, a polyethylene fiber-based nonwoven fabric was impregnated with the solution and exposed to 1 kGy/h .gamma.-ray for 5 h to give a nonwoven fabric supporting thereon C nanotube-deposited poly(acrylic acid).

IT **1306-38-3, Ceria**, uses **64417-98-7,**

Yttrium **zirconium oxide**

(substrate; nanoscale carbon-compound. dispersions and their polymerizable compounds., moldings, and manufacture.)

RN 1306-38-3 HCA

CN Cerium oxide (CeO<sub>2</sub>) (8CI, 9CI) (CA INDEX NAME)



RN 64417-98-7 HCA

CN Yttrium zirconium oxide (9CI) (CA INDEX NAME)

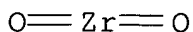
\*\*\* STRUCTURE DIAGRAM IS NOT AVAILABLE \*\*\*

IT **1314-23-4, Zirconia**, uses

(yttria-stabilized, substrate; nanoscale carbon-compound. dispersions and their polymerizable compounds., moldings, and manufacture.)

RN 1314-23-4 HCA

CN Zirconium oxide (ZrO<sub>2</sub>) (8CI, 9CI) (CA INDEX NAME)



IC ICM C08F002-44

ICS C01B031-02; C08F002-00; C08F292-00

CC 38-3 (Plastics Fabrication and Uses)

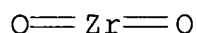
Section cross-reference(s): 47, 57, 76

- IT Filters  
Primary **batteries**  
(nanoscale carbon-contg. dispersions and their polymerizable compns., moldings, and manuf.)
- IT **1306-38-3, Ceria**, uses **64417-98-7**,  
Yttrium **zirconium oxide** 126447-16-3, Lanthanum  
strontium manganate ((La,Sr)MnO<sub>3</sub>)  
(substrate; nanoscale carbon-contg. dispersions and their  
polymerizable compns., moldings, and manuf.)
- IT **1314-23-4, Zirconia**, uses  
(yttria-stabilized, substrate; nanoscale carbon-contg.  
dispersions and their polymerizable compns., moldings, and  
manuf.)
- L57 ANSWER 5 OF 17 HCA COPYRIGHT 2006 ACS on STN  
138:257681 Solid state potentiometric gaseous oxide sensor. Wachsmann,  
Eric D.; Azad, Abul Majeed (University of Florida, USA). PCT Int.  
Appl. WO 2003027658 A1 **20030403**, 58 pp. DESIGNATED  
STATES: W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA,  
CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE,  
GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR,  
LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, OM, PH, PL,  
PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG,  
UZ, VN, YU, ZA, ZM, ZW; RW: AT, BE, BF, BJ, CF, CG, CH, CI, CM, CY,  
DE, DK, ES, FI, FR, GA, GB, GR, IE, IT, LU, MC, ML, MR, NE, NL, PT,  
SE, SN, TD, TG, TR. (English). CODEN: PIXXD2. APPLICATION: WO  
2002-US31041 20020930. PRIORITY: US 2001-966240 20010928.
- AB A solid state **electrochem. cell** for measuring  
the concn. of a component of a gas mixt. includes a 1st  
semiconductor electrode and a 2nd semiconductor electrode formed  
from 1st and 2nd semiconductor materials, resp. The materials are  
selected so as to undergo a change in resistivity upon contacting a  
gas component, such as CO or NO. An electrolyte is provided in  
contact with the 1st and 2nd semiconductor electrodes. A ref. cell  
can be included in contact with the electrolyte. Preferably, a  
voltage response of the 1st semiconductor electrode when exposed to  
the component is opposite in slope direction to that of the 2nd  
semiconductor electrode to produce a voltage response equal to the  
sum of the abs. values of the individual voltages generated. A  
combustion engine includes an emission sensor for measuring  
pollutants and a feedback and control system uses measured pollutant  
concns. to direct adjustment of engine combustion conditions.
- IT **1306-38-3, Cerium oxide (CeO<sub>2</sub>)**, uses **1314-23-4, Zirconium oxide (ZrO<sub>2</sub>)**, uses  
(ion-conducting electrolyte; solid state potentiometric gaseous  
oxide sensor for use in combustion engine feedback and control  
system)

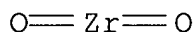
RN 1306-38-3 HCA  
CN Cerium oxide (CeO<sub>2</sub>) (8CI, 9CI) (CA INDEX NAME)



RN 1314-23-4 HCA  
CN Zirconium oxide (ZrO<sub>2</sub>) (8CI, 9CI) (CA INDEX NAME)



IT **1314-23-4D, Zirconia**, yttria-stabilized  
**64417-98-7, Yttrium zirconium oxide**  
(solid state potentiometric gaseous oxide sensor for use in  
combustion engine feedback and control system)  
RN 1314-23-4 HCA  
CN Zirconium oxide (ZrO<sub>2</sub>) (8CI, 9CI) (CA INDEX NAME)



RN 64417-98-7 HCA  
CN Yttrium zirconium oxide (9CI) (CA INDEX NAME)

\*\*\* STRUCTURE DIAGRAM IS NOT AVAILABLE \*\*\*

IC ICM G01N027-407  
ICS F02D041-14

CC 51-12 (Fossil Fuels, Derivatives, and Related Products)  
Section cross-reference(s): 59, 76, 79

IT Combustion engines  
Control apparatus

**Electrochemical cells**

Exhaust gases (engine)

Ionic conductors

Semiconductor gas sensors

Solid electrolytes

(solid state potentiometric gaseous oxide sensor for use in  
combustion engine feedback and control system)

IT 1304-76-3, Bismuth oxide (Bi<sub>2</sub>O<sub>3</sub>), uses **1306-38-3**,  
**Cerium oxide (CeO<sub>2</sub>)**, uses  
**1314-23-4, Zirconium oxide (ZrO<sub>2</sub>)**  
, uses

(ion-conducting electrolyte; solid state potentiometric gaseous  
oxide sensor for use in combustion engine feedback and control  
system)

IT **1314-23-4D, Zirconia**, yttria-stabilized  
1314-36-9D, Yttria, **zirconia** stabilized by  
**64417-98-7, Yttrium zirconium oxide**

(solid state potentiometric gaseous oxide sensor for use in combustion engine feedback and control system)

L57 ANSWER 6 OF 17 HCA COPYRIGHT 2006 ACS on STN

138:26872 Method for introduction of electrode active oxide into cathode of solid-state fuel cell. Chiba, Reiichi; Yoshimura, Bunichi; Sakurai, Yoji (Nippon Telegraph and Telephone Corp., Japan). Jpn. Kokai Tokkyo Koho JP 2002352808 A2 **20021206**, 19 pp.

(Japanese). CODEN: JKXXAF. APPLICATION: JP 2001-161836 20010530.

AB The title fuel cell is manufd. by forming a porous cathode integrated with a dense solid electrolyte by sintering, impregnating an organometal soln. or inorg. metal soln. into the cathode, and then thermally decomp. for oxidn. to introduce an electrode active oxide providing **electron** cond. and **O** ion cond.

at periphery of interface between the solid electrolyte. The active oxide may be represented as (1)  $\text{Ln}_{11}\text{-xAl}_x\text{Co}_1\text{-yB}_1\text{yO}_3$  ( $\text{Ln}_1 = \text{La, Pr, Nd, Sm, Eu, and/or Gd}$ ;  $\text{Al} = \text{Sr and/or Ca}$ ;  $x = 0\text{-}0.8$ ;  $\text{B}_1 = \text{Mn, Fe, Ni, Ga, Al, and/or Mg}$ ;  $y = 0\text{-}0.9$ ), (2)  $\text{Ln}_{21}\text{-xA}_2\text{xFe}_1\text{-yB}_2\text{yO}_3$  ( $\text{Ln}_2 = \text{La, Pr, Nd, Sm, Eu, and/or Gd}$ ;  $\text{A}_2 = \text{Sr and/or Ca}$ ;  $x = 0\text{-}0.8$ ;  $\text{B}_2 = \text{Mn, Ni, Co, Ga, Al, and/or Mg}$ ;  $y = 0.0\text{-}0.9$ ), (3)  $\text{Ln}_{3z}\text{A}_3\text{xMn}_1\text{-yB}_3\text{yO}_3$  ( $\text{Ln}_3 = \text{La, Pr, Nd, Sm, Eu, and/or Gd}$ ;  $0.999 - x \leq z \leq 0.95 - x$ ;  $\text{A}_3 = \text{Sr, Ca, and/or Ba}$ ;  $x = 0.35\text{-}0.80$ ;  $\text{B}_3 = \text{Co, Fe, Ni, Ga, Al, and/or Mg}$ ;  $y = 0.0\text{-}0.2$ ), (4)  $\text{Ce}_1\text{-x-yA}_4\text{xTi}_y\text{O}_2$  ( $\text{A}_4 = \text{La, Pr, Nd, Sm, Eu, Gd, Tb, Dy, Ho, Er, Yb, Lu, Y, and/or Sc}$ ;  $x = 0.10\text{-}0.4$ ;  $y = 0\text{-}0.2$ ), or (5)  $\text{Bi}_1\text{-xA}_5\text{xO}_{1.5}$  ( $\text{A}_5 = \text{rare earth metals and/or transition metals}$ ;  $x \leq 0.3$ ). The resulting fuel cell provides high performance.

IC ICM H01M004-88

ICS H01M004-86; H01M008-12

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

ST thermal decompn cathode active oxide solid **electrolyte** fuel **cell**

IT 1304-76-3P, Bismuth oxide ( $\text{Bi}_2\text{O}_3$ ), uses 12016-86-3P, Cobalt lanthanum oxide ( $\text{CoLaO}_3$ ) 12526-47-5P, Cobalt praseodymium oxide ( $\text{CoPrO}_3$ ) 59989-75-2P, Cobalt gadolinium strontium oxide ( $\text{Co}_2\text{GdSrO}_6$ ) 64296-91-9P, Lanthanum manganese strontium oxide ( $\text{LaMn}_2\text{SrO}_6$ ) 106390-24-3P, Bismuth yttrium oxide ( $\text{Bi}_{1.8}\text{Y}_{0.2}\text{O}_3$ ) 106390-43-6P 107068-51-9P, Cobalt neodymium strontium oxide ( $\text{CoNd}_{0.6}\text{Sr}_{0.4}\text{O}_3$ ) 108822-67-9P, Cobalt iron lanthanum strontium oxide ( $\text{Co}_{0.4}\text{Fe}_{0.6}\text{La}_{0.6}\text{Sr}_{0.4}\text{O}_3$ ) 108916-09-2P, Cobalt lanthanum strontium oxide ( $\text{CoLa}_{0.8}\text{Sr}_{0.2}\text{O}_3$ ) 109118-13-0P, Cobalt lanthanum strontium oxide ( $\text{CoLa}_{0.2}\text{Sr}_{0.8}\text{O}_3$ ) 109546-91-0P, Iron lanthanum strontium oxide ( $\text{FeLa}_{0.8}\text{Sr}_{0.2}\text{O}_3$ ) 110601-67-7P, Cobalt lanthanum nickel oxide ( $\text{Co}_{0.3}\text{LaNi}_{0.7}\text{O}_3$ ) 110620-52-5P, Cobalt lanthanum strontium oxide ( $\text{CoLa}_{0.6}\text{Sr}_{0.4}\text{O}_3$ ) 110641-93-5P, Iron lanthanum nickel oxide ( $\text{Fe}_{0.3}\text{LaNi}_{0.7}\text{O}_3$ ) 110758-52-6P, Iron lanthanum strontium oxide ( $\text{FeLa}_{0.6}\text{Sr}_{0.4}\text{O}_3$ ) 115112-56-6P, Cobalt samarium strontium oxide ( $\text{CoSm}_{0.6}\text{Sr}_{0.4}\text{O}_3$ ) 115135-40-5P, Cobalt praseodymium

strontium oxide (CoPr0.6Sr0.4O3) 115135-46-1P, Cobalt lanthanum  
nickel strontium oxide (Co0.8La0.6Ni0.2Sr0.4O3) 115135-47-2P,  
Cobalt iron lanthanum strontium oxide (Co0.8Fe0.2La0.6Sr0.4O3)  
116738-87-5P, Iron lanthanum strontium oxide (FeLa0.2Sr0.8O3)  
117127-91-0P, Calcium cobalt lanthanum oxide (Ca0.2CoLa0.8O3)  
117655-93-3P, Calcium cobalt lanthanum oxide (Ca0.4CoLa0.6O3)  
129268-78-6P, Cobalt praseodymium strontium oxide (CoPr0.2Sr0.8O3)  
130071-47-5P, Cerium praseodymium oxide (Ce0.8Pr0.2O2)  
132325-87-2P, Calcium cobalt lanthanum oxide (Ca0.8CoLa0.2O3)  
136574-80-6P, Calcium cobalt gadolinium oxide (Ca0.5CoGd0.5O3)  
136854-58-5P, Cerium gadolinium oxide (Ce0.8Gd0.2O2) 144857-61-4P,  
Cobalt europium strontium oxide (CoEu0.5Sr0.5O3) 148595-66-8P,  
Cobalt iron lanthanum strontium oxide (Co0.2Fe0.8La0.6Sr0.4O3)  
149319-01-7P, Cerium yttrium oxide (Ce0.8Y0.2O2) 156363-84-7P,  
Cerium lanthanum oxide (Ce0.8La0.2O2) 156363-85-8P, Cerium  
neodymium oxide (Ce0.8Nd0.2O2) 158307-84-7P, Iron lanthanum  
manganese strontium oxide (Fe0.8La0.6Mn0.2Sr0.4O3) 159423-44-6P,  
Cerium samarium oxide (Ce0.9Sm0.1O2) 162105-72-8P, Cerium samarium  
oxide (Ce0.8Sm0.2O2) 183134-75-0P, Cerium terbium oxide  
(Ce0.8Tb0.2O2) 184045-32-7P, Iron lanthanum nickel strontium oxide  
(Fe0.8La0.6Ni0.2Sr0.4O3) 209541-50-4P, Bismuth niobium oxide  
(Bi0.9Nb0.1O1.5) 210474-64-9P, Bismuth lanthanum oxide  
(Bi1.8La0.2O3) 220696-91-3P, Gallium lanthanum nickel oxide  
(Ga0.7LaNi0.3O3) 261732-88-1P, Calcium cobalt samarium oxide  
(Ca0.4CoSm0.6O3) 281194-49-8P, Cerium europium oxide  
(Ce0.8Eu0.2O2) 320413-44-3P 477849-88-0P, Cobalt strontium  
terbium oxide (CoSr0.5Tb0.5O3) 477849-89-1P, Calcium cobalt  
praseodymium oxide (Ca0.4CoPr0.6O3) 477849-90-4P, Calcium cobalt  
praseodymium oxide (Ca0.8CoPr0.2O3) 477849-91-5P, Calcium cobalt  
neodymium oxide (Ca0.4CoNd0.6O3) 477849-92-6P, Calcium cobalt  
europium oxide (Ca0.5CoEu0.5O3) 477849-93-7P, Calcium cobalt  
terbium oxide (Ca0.5CoTb0.5O3) 477849-94-8P, Cobalt lanthanum  
nickel strontium oxide (Co0.5La0.9Ni0.5Sr0.1O3) 477849-95-9P,  
Cobalt gallium lanthanum strontium oxide (Co0.7Ga0.3La0.6Sr0.4O3)  
477849-97-1P, Cobalt gallium lanthanum strontium oxide  
(Co0.1Ga0.9La0.6Sr0.4O3) 477849-99-3P 477850-00-3P  
477850-01-4P, Gallium lanthanum nickel strontium oxide  
(Ga0.7La0.9Ni0.3Sr0.1O3) 477850-02-5P 477850-03-6P  
477850-04-7P 477850-05-8P 477850-06-9P, Gallium iron lanthanum  
strontium oxide (Ga0.3Fe0.7La0.6Sr0.4O3) 477850-07-0P, Gallium  
iron lanthanum strontium oxide (Ga0.9Fe0.1La0.6Sr0.4O3)  
477850-08-1P, Aluminum iron lanthanum strontium oxide  
(Al0.15Fe0.85La0.6Sr0.4O3) 477850-09-2P, Aluminum iron lanthanum  
strontium oxide (Al0.9Fe0.1La0.6Sr0.4O3) 477850-10-5P  
477850-11-6P 477850-12-7P 477850-13-8P 477850-14-9P, Lanthanum  
manganese strontium oxide (La0.64MnSr0.35O3) 477850-16-1P,  
Lanthanum manganese strontium oxide (La0.49MnSr0.5O3)  
477850-18-3P, Lanthanum manganese strontium oxide (La0.19MnSr0.8O3)

477850-20-7P, Manganese praseodymium strontium oxide  
 (MnPr0.84Sr0.15O3) 477850-22-9P, Manganese praseodymium strontium  
 oxide (MnPr0.49Sr0.5O3) 477850-24-1P, Manganese neodymium  
 strontium oxide (MnNd0.49Sr0.5O3) 477850-26-3P, Manganese samarium  
 strontium oxide (MnSm0.49Sr0.5O3) 477850-28-5P, Europium manganese  
 strontium oxide (Eu0.49MnSr0.5O3) 477850-30-9P, Gadolinium  
 manganese strontium oxide (Gd0.49MnSr0.5O3) 477850-32-1P, Calcium  
 lanthanum manganese oxide (Ca0.5La0.49MnO3) 477850-34-3P, Calcium  
 gadolinium manganese oxide (Ca0.5Gd0.49MnO3) 477850-36-5P, Barium  
 lanthanum manganese oxide (Ba0.5La0.49MnO3) 477850-38-7P, Barium  
 gadolinium manganese oxide (Ba0.5Gd0.49MnO3) 477850-40-1P  
 477850-42-3P, Iron lanthanum manganese strontium oxide  
 (Fe0.1La0.59Mn0.9Sr0.4O3) 477850-44-5P 477850-46-7P  
 477850-48-9P 477850-50-3P 477850-55-8P, Cerium samarium oxide  
 (Ce0.6Sm0.4O2) 477850-63-8P, Cerium dysprosium oxide  
 (Ce0.8Dy0.2O2) 477850-65-0P, Cerium holmium oxide (Ce0.8Ho0.2O2)  
 477850-67-2P, Cerium erbium oxide (Ce0.8Er0.2O2) 477850-69-4P,  
 Cerium ytterbium oxide (Ce0.8Yb0.2O2) 477850-71-8P, Cerium  
 lutetium oxide (Ce0.8Lu0.2O2) 477850-73-0P, Cerium scandium oxide  
 (Ce0.8Sc0.2O2) 477850-75-2P, Cerium samarium yttrium oxide  
 (Ce0.8Sm0.1Y0.1O2) 477850-77-4P, Cerium samarium titanium oxide  
 (Ce0.7Sm0.1Ti0.2O2) 477850-79-6P, Cerium samarium titanium oxide  
 (Ce0.6Sm0.2Ti0.2O2) 477850-81-0P, Cerium samarium titanium yttrium  
 oxide (Ce0.6Sm0.1Ti0.2Y0.1O2) 477850-86-5P, Bismuth **cerium**  
**oxide** (Bi1.7Ce0.3O3) 477850-88-7P, Bismuth neodymium oxide  
 (Bi1.7Nd0.3O3) 477850-90-1P, Bismuth lutetium oxide (Bi1.8Lu0.2O3)  
 477850-94-5P, Bismuth tantalum oxide (Bi1.8Ta0.2O3) 477850-96-7P,  
 Bismuth tungsten oxide (Bi1.8W0.2O3) 477850-99-0P, Bismuth  
 molybdenum oxide (Bi1.8Mo0.2O3) 477851-01-7P, Bismuth  
**zirconium oxide** (Bi1.8Zr0.2O3) 477851-12-0P,  
 Gallium iron lanthanum strontium oxide (Ga0.2Fe0.8La0.6Sr0.4O3)  
 (introduction of electrode active oxide into cathode by thermal  
 decompn. for solid-state fuel cell)

L57 ANSWER 7 OF 17 HCA COPYRIGHT 2006 ACS on STN

131:190965 Simultaneous determination of chemical diffusion and surface  
 exchange coefficients of oxygen by the potential step technique.  
 Diethelm, Stefan; Closset, Alexandre; Nisancioglu, Kemal; Van herle,  
 Jan; McEvoy, A. J.; Gur, Turgut M. (Laboratoire de Photonique et  
 Interfaces, Ecole Polytechnique Federale de Lausanne, Lausanne, CH  
 1015, Switz.). Journal of the Electrochemical Society, 146(7),  
 2606-2612 (English) **1999**. CODEN: JESOAN. ISSN:  
 0013-4651. Publisher: Electrochemical Society.

AB Oxygen diffusion is treated in a dense electronically conducting  
 cobaltate pellet blocked ionically on one surface, electronically on  
 the other, and sealed on its cylindrical periphery. A procedure is  
 developed for extg. the chem. diffusion and surface exchange coeffs.  
 for oxygen by use of the asymptotic equations derived for the

current response to a potential step at short and long times. It is shown that, while the formation of interfacial phases by reaction between the sample and the electrolyte may affect the surface exchange coeff., the chem. diffusion coeff. data detd. by the present approach are independent of such interfacial phenomena. The consistency of data obtained from several specimens with varying thickness and manner of interfacing with the electrolyte validates the diffusion model and the method used for data anal. An oxygen permeation cell is also developed in this work as a modification of the diffusion cell. The new cell allows monitoring of the permeation rate by electrochem. means. The steady-state permeation data obtained by the permeation cell are consistent with the chem.-diffusion and surface-exchange coeffs. measured by the blocked diffusion cell as long as the assumptions of the related theor. models are satisfied. This is a further validation of the diffusion model and the related methodol. developed here for obtaining the necessary data for characterizing oxygen exchange and transport in such materials.

IT **64417-98-7, Yttrium zirconium oxide**

(chem. diffusion and surface exchange coeffs. of oxygen in cobaltates measured in blocked **cell** with **electrolyte** from)

RN 64417-98-7 HCA

CN Yttrium zirconium oxide (9CI) (CA INDEX NAME)

\*\*\* STRUCTURE DIAGRAM IS NOT AVAILABLE \*\*\*

IT **1306-38-3, Ceria**, uses

(yttria and gadolinia doped; chem. diffusion and surface exchange coeffs. of oxygen in cobaltates measured in blocked **cell** with **electrolyte** from)

RN 1306-38-3 HCA

CN Cerium oxide (CeO<sub>2</sub>) (8CI, 9CI) (CA INDEX NAME)

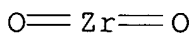


IT **1314-23-4, Zirconium oxide (ZrO<sub>2</sub>)**, uses

(yttria stabilized; chem. diffusion and surface exchange coeffs. of oxygen in cobaltates measured in blocked **cell** with **electrolyte** from)

RN 1314-23-4 HCA

CN Zirconium oxide (ZrO<sub>2</sub>) (8CI, 9CI) (CA INDEX NAME)



CC 72-3 (Electrochemistry)

Section cross-reference(s): 65, 69



- IT **Electrolytic cells**  
(simultaneous detn. of chem. diffusion and surface exchange coeffs. of oxygen by potential step technique obtained in permeation cell)
- IT **64417-98-7, Yttrium zirconium oxide**  
(chem. diffusion and surface exchange coeffs. of oxygen in cobaltates measured in blocked **cell** with **electrolyte** from)
- IT **1306-38-3, Ceria**, uses  
(yttria and gadolinia doped; chem. diffusion and surface exchange coeffs. of oxygen in cobaltates measured in blocked **cell** with **electrolyte** from)
- IT **1314-23-4, Zirconium oxide (ZrO<sub>2</sub>)**, uses  
(yttria stabilized; chem. diffusion and surface exchange coeffs. of oxygen in cobaltates measured in blocked **cell** with **electrolyte** from)
- IT 1314-36-9, Yttrium oxide (Y<sub>2</sub>O<sub>3</sub>), uses  
(**zirconia** stabilized by; chem. diffusion and surface exchange coeffs. of oxygen in cobaltates measured in blocked **cell** with **electrolyte** from)

L57 ANSWER 8 OF 17 HCA COPYRIGHT 2006 ACS on STN

131:50994 The role of the solid electrolyte support on the NEMCA behavior of ethylene oxidation on Pt. Makri, M.; Buekenhoudt, A.; Luyten, J.; Brosda, S.; Petrolekas, P.; Pliangos, C.; Bebelis, S.; Vayenas, C. G. (Department of Chemical Engineering, University of Patras, Patras, GR-26500, Greece). Institution of Chemical Engineers Symposium Series, 145(Electrochemical Engineering), 269-280 (English) **1999**. CODEN: ICESDB. ISSN: 0307-0492. Publisher: Institution of Chemical Engineers.

AB The effect of non-Faradaic electrochem. modification of catalytic activity (NEMCA) or electrochem. promotion (EP) has been investigated for the oxidn. of ethylene on Pt using several types of solid electrolytes and mixed conductors. The common features and differences are summarized and discussed together with the underlying electrochem. promotion mechanism on the basis of recent exptl. and theor. studies.

IT **64417-98-7, Yttrium zirconium oxide**  
(ethylene electrooxidn. on Pt, in **electrolytic cell** with YSZ solid electrolyte support)

RN 64417-98-7 HCA

CN Yttrium zirconium oxide (9CI) (CA INDEX NAME)

\*\*\* STRUCTURE DIAGRAM IS NOT AVAILABLE \*\*\*

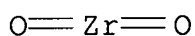
IT **1306-38-3, Cerium dioxide**, uses  
(solid electrolyte support for ethylene electrooxidn. on Pt)

RN 1306-38-3 HCA

CN Cerium oxide (CeO<sub>2</sub>) (8CI, 9CI) (CA INDEX NAME)



IT 1314-23-4, Zirconium oxide (ZrO2), uses  
(yttria stabilized; ethylene electrooxidn. on Pt, in **electrolytic cell** with YSZ solid electrolyte support)  
RN 1314-23-4 HCA  
CN Zirconium oxide (ZrO2) (8CI, 9CI) (CA INDEX NAME)



CC 72-2 (Electrochemistry)  
Section cross-reference(s): 67  
IT 64417-98-7, Yttrium zirconium oxide  
(ethylene electrooxidn. on Pt, in **electrolytic cell** with YSZ solid electrolyte support)  
IT 11138-49-1, Aluminum sodium oxide  
(ethylene electrooxidn. on Pt, in **electrolytic cell** with .beta.-Al2O3 solid electrolyte support)  
IT 1306-38-3, Cerium dioxide, uses  
13463-67-7, Titanium dioxide, uses 58572-20-6, Sodium zirconium phosphate silicate (Na3Zr2(PO4)(SiO4)2) 142107-79-7, Calcium indium zirconium oxide CaIn0.1Zr0.9O3  
(solid electrolyte support for ethylene electrooxidn. on Pt)  
IT 1314-23-4, Zirconium oxide (ZrO2), uses  
(yttria stabilized; ethylene electrooxidn. on Pt, in **electrolytic cell** with YSZ solid electrolyte support)  
IT 1314-36-9, Yttrium oxide (Y2O3), uses  
(zirconia stabilized by; ethylene electrooxidn. on Pt, in **electrolytic cell** with YSZ solid electrolyte support)  
L57 ANSWER 9 OF 17 HCA COPYRIGHT 2006 ACS on STN  
129:43242 Oxygen surface exchange of Y0.2Ce0.8O2-x under reducing atmosphere. Horita, Teruhisa; Yamaji, Katsuhiko; Sakai, Natsuko; Ishikawa, Masahiko; Yokokawa, Harumi; Kawada, Tatsuya; Dokiya, Masayuki (National Institute of Materials and Chemical Research, Tsukuba, 305, Japan). Electrochemical and Solid-State Letters, 1(1), 4-6 (English) 1998. CODEN: ESLEF6. ISSN: 1099-0062. Publisher: Electrochemical Society.  
AB Oxygen surface exchange was measured for Y0.2Ce0.8O2-x (YDC) and Y0.15Zr0.85O2-y (YSZ) over a wide range of oxygen partial pressures

(7.3 .times. 10<sup>-21</sup> to 0.17 bar) by isotope oxygen exchange (180/160) using secondary-ion mass spectrometry anal. at 973 K. Diffusion depth profiles of 180 in YDC and YSZ were analyzed by an appropriate fitting equation to calc. diffusion coeff. (D) and surface exchange coeff. (k). The diffusion coeffs. (D) for YDC and YSZ are consistent with the ref. data. The k values for both materials were similar (about k = 5-9 .times. 10<sup>-8</sup> cm s<sup>-1</sup>) at the same temps. The k value increases with decreasing oxygen partial pressure for both YDC and YSZ. A relationship between the k value and the concns. of **electron** and **oxygen** vacancy is discussed.

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
ST fuel cell yttrium **cerium oxide**; oxygen surface  
exchange yttrium **cerium oxide**

IT Fuel **cell electrolytes**  
Solid state fuel cells

(oxygen surface-exchange of Y0.2Ce0.8O2-x under reducing atm.)  
IT 7782-44-7, Oxygen, processes 149319-01-7D, Cerium yttrium oxide  
ce0.8y0.2o2, oxygen-deficient 177739-22-9D, Yttrium  
**zirconium oxide** Y0.15Zr0.85O2, oxygen-deficient  
(oxygen surface exchange of Y0.2Ce0.8O2-x under reducing atm.)

L57 ANSWER 10 OF 17 HCA COPYRIGHT 2006 ACS on STN

129:22439 Intercalation compounds with lithium and oxygen guests.  
Bruce, Peter G.; Armstrong, A. Robert; Gitzendanner, Robert;  
Jennings, Richard; Thomson, James (School of Chemistry, University  
of St Andrews, St Andrews, KY16 9ST, UK). Proceedings -  
Electrochemical Society, 97-24(Ionic and Mixed Conducting Ceramics),  
205-218 (English) **1998**. CODEN: PESODO. ISSN: 0161-6374.  
Publisher: Electrochemical Society.

AB The synthesis and intercalation chem. of layered LixMnO2 is  
presented. This material cannot be prepd. by conventional means,  
instead its synthesis involves the formation of the Na phase NaMnO2  
followed by ion exchange. Extn. of Li involves conversion of the  
monoclinically distorted layered structure to the more regular  
rhombohedral structure at Li0.5MnO2. On fully deintercalating Li a  
new polymorph of MnO2 with a layered structure was obtained. On  
charge/discharge, capacity is lost during the 1st cycle. O  
was **intercalated** for the 1st time into a oxide with a  
pyrochlore structure, specifically Ce2Zr2O7. O  
**intercalation** is accompanied by displacement of some of the  
oxide ions to make more equitable coordination nos. round the Ce and  
Zr ions. It is possible to **intercalate** O up to  
the compn. of fluorite Ce2Zr2O8 while retaining the cation ordering  
of pyrochlore.

IT **12157-80-1P**, Cerium zirconium oxide (Ce2Zr2O7)  
(prepn. and **oxygen intercalation** of)

RN 12157-80-1 HCA

CN Cerium zirconium oxide (Ce2Zr2O7) (8CI, 9CI) (CA INDEX NAME)

\*\*\* STRUCTURE DIAGRAM IS NOT AVAILABLE \*\*\*

IT **12157-80-1DP**, Cerium zirconium oxide (Ce<sub>2</sub>Zr<sub>2</sub>O<sub>7</sub>),  
oxygen-excess  
(prepn. of)

RN 12157-80-1 HCA

CN Cerium zirconium oxide (Ce<sub>2</sub>Zr<sub>2</sub>O<sub>7</sub>) (8CI, 9CI) (CA INDEX NAME)

\*\*\* STRUCTURE DIAGRAM IS NOT AVAILABLE \*\*\*

CC 78-3 (Inorganic Chemicals and Reactions)

Section cross-reference(s): **72**

ST lithium manganese oxide intercalation compd prepn; cerium zirconium  
oxide intercalation compd prepn; **intercalation** compd  
lithium **oxygen** guest prepn

IT **12157-80-1P**, Cerium zirconium oxide (Ce<sub>2</sub>Zr<sub>2</sub>O<sub>7</sub>)  
(prepn. and **oxygen intercalation** of)

IT **12157-80-1DP**, Cerium zirconium oxide (Ce<sub>2</sub>Zr<sub>2</sub>O<sub>7</sub>),  
oxygen-excess  
(prepn. of)

L57 ANSWER 11 OF 17 HCA COPYRIGHT 2006 ACS on STN

129:11943 Thermodynamic behavior of various phases appearing in the  
CeZrO<sub>4</sub>-CeZrO<sub>3.5</sub> system and the formation of metastable solid  
solutions. Otsuka-Yao-Matsuo, Shinya; Izu, Noriya; Omata, Takahisa;  
Ikeda, Katsuhiko (Department of Materials Science and Processing,  
Graduate School of Engineering, Osaka University, Suita, 565-0871,  
Japan). Journal of the Electrochemical Society, 145(4), 1406-1413  
(English) **1998**. CODEN: JESOAN. ISSN: 0013-4651.  
Publisher: Electrochemical Society.

AB To study the thermodyn. behavior of t', t\*, and .kappa. phases  
CeZrO<sub>4</sub>, the equil. O partial pressure, pO<sub>2</sub>, over their mixts. with  
pyrochlore (Ce<sub>2</sub>Zr<sub>2</sub>O<sub>7</sub>+x) was measured using an **electrochem.**  
**cell**: Pt, {CeZrO<sub>4</sub>(t', t\*, or .kappa. phase) +  
Ce<sub>2</sub>Zr<sub>2</sub>O<sub>7</sub>+x}/ZrO<sub>2</sub>(+Y<sub>2</sub>O<sub>3</sub>)/air, Pt. The conclusions described below  
were derived: the thermodyn. stability of the .kappa. phase is the  
lowest in the CeO<sub>2</sub>-ZrO<sub>2</sub> system. The .kappa. phase forms metastable  
solid solns. with the pyrochlore phase; it was virtually stable  
around 1123 K. Two kinds of tetragonal phases exist, tet. (high  
temp.) and tet. (low temp.), which may correspond to t' and t\*,  
resp. A change in pO<sub>2</sub> corresponding to the phase transitions:  
.kappa. .fwdarw. t' and t' .dblarw. t\* was obsd. The std. Gibbs  
energies of formation, .DELTA.G.degree., of .kappa.(CeZrO<sub>4</sub>) and  
t\*(CeZrO<sub>4</sub>) for the reaction: 0.5Ce<sub>2</sub>Zr<sub>2</sub>O<sub>7</sub> + 1/4O<sub>2</sub> .fwdarw. CeZrO<sub>4</sub>  
were evaluated from the emf. data.

IT **207459-97-0P**, Cerium zirconium oxide (Ce<sub>2</sub>Zr<sub>2</sub>O<sub>7</sub>.67)

**207459-99-2P**, Cerium zirconium oxide (Ce<sub>2</sub>Zr<sub>2</sub>O<sub>7</sub>.53)

**207460-03-5P**, Cerium zirconium oxide (Ce<sub>2</sub>Zr<sub>2</sub>O<sub>7</sub>.05)

(formation and crystal structure)

RN 207459-97-0 HCA

CN Cerium zirconium oxide (Ce<sub>2</sub>Zr<sub>2</sub>O<sub>7</sub>.67) (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
=====+=====+=====		
O	7.67	17778-80-2
Zr	2	7440-67-7
Ce	2	7440-45-1

RN 207459-99-2 HCA

CN Cerium zirconium oxide (Ce<sub>2</sub>Zr<sub>2</sub>O<sub>7.53</sub>) (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
=====+=====+=====		
O	7.53	17778-80-2
Zr	2	7440-67-7
Ce	2	7440-45-1

RN 207460-03-5 HCA

CN Cerium zirconium oxide (Ce<sub>2</sub>Zr<sub>2</sub>O<sub>7.05</sub>) (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
=====+=====+=====		
O	7.05	17778-80-2
Zr	2	7440-67-7
Ce	2	7440-45-1

IT **12157-80-1P**, Cerium zirconium oxide (Ce<sub>2</sub>Zr<sub>2</sub>O<sub>7</sub>)  
(reaction with oxygen)

RN 12157-80-1 HCA

CN Cerium zirconium oxide (Ce<sub>2</sub>Zr<sub>2</sub>O<sub>7</sub>) (8CI, 9CI) (CA INDEX NAME)

\*\*\* STRUCTURE DIAGRAM IS NOT AVAILABLE \*\*\*

IT **53169-24-7**, Cerium zirconium oxide (CeZrO<sub>4</sub>)

(thermodn. behavior of various phases appearing in  
CeZrO<sub>4</sub>-CeZrO<sub>3.5</sub> system and formation of metastable solid solns.)

RN 53169-24-7 HCA

CN Cerium zirconium oxide (CeZrO<sub>4</sub>) (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
=====+=====+=====		
O	4	17778-80-2
Zr	1	7440-67-7
Ce	1	7440-45-1

CC 78-2 (Inorganic Chemicals and Reactions)

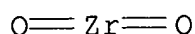
Section cross-reference(s): 69, 75

- IT **207459-97-0P**, Cerium zirconium oxide (Ce<sub>2</sub>Zr<sub>2</sub>O<sub>7</sub>.67)  
**207459-99-2P**, Cerium zirconium oxide (Ce<sub>2</sub>Zr<sub>2</sub>O<sub>7</sub>.53)  
**207460-03-5P**, Cerium zirconium oxide (Ce<sub>2</sub>Zr<sub>2</sub>O<sub>7</sub>.05)  
(formation and crystal structure)
- IT **12157-80-1P**, Cerium zirconium oxide (Ce<sub>2</sub>Zr<sub>2</sub>O<sub>7</sub>)  
(reaction with oxygen)
- IT **53169-24-7**, Cerium zirconium oxide (CeZrO<sub>4</sub>)  
(thermodn. behavior of various phases appearing in  
CeZrO<sub>4</sub>-CeZrO<sub>3.5</sub> system and formation of metastable solid solns.)
- L57 ANSWER 12 OF 17 HCA COPYRIGHT 2006 ACS on STN  
126:283965 Nitric oxide reduction using platinum electrodes on  
yttria-stabilized **zirconia**. Walsh, Kenneth J.; Fedkiw,  
Peter S. (Department of Chemical Engineering, North Carolina State  
University, Raleigh, USA). Solid State Ionics, 93(1,2), 17-31  
(English) **1996**. CODEN: SSIOD3. ISSN: 0167-2738.  
Publisher: Elsevier.
- AB Porous platinum and platinum/**ceria** electrodes deposited on  
yttria-stabilized **zirconia** (YSZ) were used to reduce  
electrochem. nitric oxide in inert gases at 500-600.degree.. A  
cyclic voltammetric study indicates that nitric oxide redn. occurs  
more rapidly on an electrode thermodynamically predicted to exist as  
reduced platinum and not as platinum dioxide. The steady-state  
nitric oxide decompn. rate increases with temp., NO concn., and  
cathodic polarization. Nitric oxide is also reduced on the  
platinum-based electrodes in streams contg. both nitric oxide and  
oxygen. The currents at a given electrode potential and temp. are  
more than an order of magnitude higher in the NO/O<sub>2</sub> streams than in  
the NO/inert gases due to simultaneous oxygen redn. The yield  
factors, defined as the relative rate of NO redn. compared to O<sub>2</sub>  
redn. (cor. for species concns.), are 0.2-0.6 for both electrodes.  
The yield factors are insensitive to **ceria** addn., oxygen  
concn., applied current, and temp. in the ranges studied.
- IT **1306-38-3, Ceria**, uses  
(nitric oxide redn. using platinum and platinum/**ceria**  
electrodes deposited on yttria-stabilized **zirconia**)
- RN 1306-38-3 HCA  
CN Cerium oxide (CeO<sub>2</sub>) (8CI, 9CI) (CA INDEX NAME)



- IT **64417-98-7, Yttrium zirconium oxide**  
(nitric oxide redn. using platinum electrodes on  
yttria-stabilized **zirconia**)
- RN 64417-98-7 HCA  
CN Yttrium zirconium oxide (9CI) (CA INDEX NAME)  
\*\*\* STRUCTURE DIAGRAM IS NOT AVAILABLE \*\*\*

IT **1314-23-4, Zirconia**, uses  
(yttria-stabilized; nitric oxide redn. using platinum electrodes  
on)  
RN 1314-23-4 HCA  
CN Zirconium oxide (ZrO<sub>2</sub>) (8CI, 9CI) (CA INDEX NAME)



CC 72-2 (Electrochemistry)  
Section cross-reference(s): 67  
IT Reduction, electrochemical  
(of nitric oxide using platinum electrodes on yttria-stabilized  
**zirconia**)  
IT **Electrochemical cells**  
(yttria-stabilized **zirconia** cell for redn. of NO)  
IT **1306-38-3, Ceria**, uses  
(nitric oxide redn. using platinum and platinum/**ceria**  
electrodes deposited on yttria-stabilized **zirconia**)  
IT 7440-06-4, Platinum, uses **64417-98-7, Yttrium**  
**zirconium oxide** 114168-16-0, Yttrium  
**zirconium oxide** y0.16zr0.92o2.08  
(nitric oxide redn. using platinum electrodes on  
yttria-stabilized **zirconia**)  
IT 10102-43-9, Nitric oxide, properties  
(nitric oxide redn. using platinum electrodes on  
yttria-stabilized **zirconia**)  
IT 7782-44-7, Oxygen, properties  
(nitric oxide redn. with and without oxygen using platinum and  
platinum/**ceria** electrodes deposited on  
yttria-stabilized **zirconia**)  
IT **1314-23-4, Zirconia**, uses  
(yttria-stabilized; nitric oxide redn. using platinum electrodes  
on)  
IT 1314-36-9, Yttria, uses  
(**zirconia** stabilized by; nitric oxide redn. using  
platinum electrodes on)  
  
L57 ANSWER 13 OF 17 HCA COPYRIGHT 2006 ACS on STN  
124:207233 Anodes for solid-**electrolyte** fuel **cells**.  
Nakanishi, Naoya; Kadowaki, Shoten; Kawamura, Hiroyuki; Taniguchi,  
Shunsuke; Yasuo, Koji; Akyama, Yukinori; Myake, Yasuo; Saito,  
Toshihiko (Sanyo Electric Co, Japan). Jpn. Kokai Tokkyo Koho JP  
07326364 A2 **19951212** Heisei, 5 pp. (Japanese). CODEN:  
JKXXAF. APPLICATION: JP 1994-119900 19940601.  
AB The anodes comprise surface modified ceramics contg. ceramic  
particles coated with conductors having **O** ion and  
**electron** cond. and metals. The conductors may be Ce-based

oxides, e.g., (**CeO<sub>2</sub>**)<sub>0.8</sub>(Sm<sub>2</sub>O<sub>3</sub>)<sub>0.2</sub>, (**CeO<sub>2</sub>**)<sub>0.8</sub>(Y<sub>2</sub>O<sub>3</sub>)<sub>0.2</sub>, (**CeO<sub>2</sub>**)<sub>0.8</sub>(La<sub>2</sub>O<sub>3</sub>)<sub>0.2</sub> or Pr oxides, e.g., PrO<sub>x</sub> (0 < x ≤ 3). Fuel cells using these anodes have high voltage and long life.

IC ICM H01M004-86

ICS C04B035-50; H01M004-88; H01M008-02; H01M008-12

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
Section cross-reference(s): 57

ST **ceria** conductor ceramic metal anode; praseodymium oxide  
ceramic metal anode; solid **electrolyte** fuel **cell**  
anode

IT 64417-98-7, Yttrium **zirconium oxide**  
(fuel-cell anodes from surface-modified)

L57 ANSWER 14 OF 17 HCA COPYRIGHT 2006 ACS on STN

110:138525 Electrocatalytic conversion of light hydrocarbons to  
synthesis gas. Mazanec, Terry J.; Cable, Thomas L.; Frye, John G.,  
Jr. (Standard Oil Co., USA). U.S. US 4793904 A **19881227**,  
6 pp. (English). CODEN: USXXAM. APPLICATION: US 1987-105120  
19871005.

AB Synthesis gas is produced from light hydrocarbons such as CH<sub>4</sub> or  
natural gas by: providing an **electrochem. cell**  
comprising a solid electrolyte having a 1st surface coated with  
conductive metal, metal oxide, or their mixts. capable of  
facilitating the redn. of O to O<sup>2-</sup> ions; and 2nd surface coated with  
conductive metal, metal oxide, or their mixts., provided that both  
coatings are stable at the operating temps.; heating the cell to  
≤ 1000 °C; passing an O-contg. gas in contact with the  
1st conductive coating; passing CH<sub>4</sub>, natural gas, or other light  
hydrocarbons in contact with the 2nd conductive coating; and  
recovering synthesis gas. The 2 coatings are connected to an  
external circuit to generate electricity during the conversion of  
the hydrocarbon. The solid electrolyte is preferably Y<sub>2</sub>O<sub>3</sub>- or  
CaO-stabilized ZrO<sub>2</sub>; the 1st coating can be Ni, Au, Pt, Pd, Cu,  
La-Mg-Sr, ITO, or their mixts.; and the 2nd coating can be Ni, Au,  
Pt, Pd, Cu, their mixts., Ce oxide-La oxide, or Ce oxide-ZrO<sub>2</sub>. The  
recovered gas comprises CO, H<sub>2</sub>, and at least some C<sub>2</sub>H<sub>2</sub>. A cell  
having a 1st Pt coating and a 2nd CeZrO<sub>4</sub> coating operated at  
1100 °C had 49.2% conversion of CH<sub>4</sub> with a selectivity (moles  
of C in product/mol of CH<sub>4</sub> converted) of CO 90.9, CO<sub>2</sub> 8.2, and C<sub>2</sub>  
material 0.9%.

IT **53169-24-7**, Cerium zirconium oxide (CeZrO<sub>4</sub>)  
(electrodes, in **galvanic cells** for  
electrocatalytic conversion of hydrocarbons in synthesis gas  
manuf.)

RN 53169-24-7 HCA

CN Cerium zirconium oxide (CeZrO<sub>4</sub>) (9CI) (CA INDEX NAME)



Component	Ratio	Component Registry Number
=====	=====	=====
O	4	17778-80-2
Zr	1	7440-67-7
Ce	1	7440-45-1

IC ICM C25B003-00

INCL 204-59R

CC 51-11 (Fossil Fuels, Derivatives, and Related Products)

Section cross-reference(s): 52, 72

IT 1312-81-8, Lanthanum oxide (La<sub>2</sub>O<sub>3</sub>)

(electrodes contg. ceria and, in **galvanic cell**  
for electrocatalytic conversion of hydrocarbons in synthesis gas  
manuf.)

IT 11129-18-3, Cerium oxide (unspecified)

(electrodes contg. lanthanum oxide and, in **galvanic  
cells** for electrocatalytic conversion of hydrocarbons in  
synthesis gas manuf.)

IT 7440-02-0, Nickel, uses and miscellaneous 7440-05-3, Palladium,  
uses and miscellaneous 7440-06-4, Platinum, uses and miscellaneous  
7440-50-8, Copper, uses and miscellaneous 7440-57-5, Gold, uses  
and miscellaneous 50926-11-9, ITO **53169-24-7**, Cerium  
zirconium oxide (CeZrO<sub>4</sub>) 119763-58-5, Lanthanum, magnesium,  
strontium

(electrodes, in **galvanic cells** for  
electrocatalytic conversion of hydrocarbons in synthesis gas  
manuf.)

L57 ANSWER 15 OF 17 HCA COPYRIGHT 2006 ACS on STN

102:53035 Development and operation of thin-layer cells for  
high-temperature electrolysis. Dietrich, G.; Hermeking, H.; Koch,  
A.; Mueller, W. J. C.; Schaefer, W. (Dornier Syst. G.m.b.H.,  
Friedrichshafen, D-7990, Fed. Rep. Ger.). Comm. Eur. Communities,  
[Rep.] EUR, EUR 9079, 96 pp. (German) **1984**. CODEN:  
CECED9.

AB An attempt was made to produce loss-free high-temp.

**electrolytic (HTE) cells** (for producing H<sub>2</sub> from  
H<sub>2</sub>O vapor) by using thin layers of solid electrolytes. The redn. of  
elec. losses or an increased c.d. at the same losses is the result  
of decreasing the electrolyte resistance by using these thin-layer  
cells. The cells were in the form of hollow cylinders. A simple  
method of gas transport and the elec. series connection of  
individual cells was possible. The Y-stabilized ZrO<sub>2</sub>  
**electrolyte** for these **cells** was produced by using  
the electrochem. vapor deposition process. This process, originally  
used for coating disk-like HTE cells, was modified and further  
improved. The modified process allowed one to produce Y-stabilized

ZrO<sub>2</sub> electrolyte with a thickness of 30 .mu.m with excellent reproducibility. A schematic representation of the completed cell is shown. The cathodes are made of Ni-cermet (Ni, Ce oxide, ZrO<sub>2</sub>) or Pt and the anodes of Ca-doped LaMnO<sub>3</sub> or Pt. The std. conditions were a gas flow of 50 N-cm<sup>3</sup>/min H<sub>2</sub> + 100 N-cm<sup>3</sup>/min H<sub>2</sub>O in the cathode chamber and a temp. of 1000.degree..

IT **94270-06-1**

(cathodes, for high-temp. **electrolytic cells**  
for hydrogen manuf. from water vapor)

RN 94270-06-1 HCA

CN Nickel alloy, base, Ni,CeO<sub>2</sub>,ZrO<sub>2</sub> (9CI) (CA INDEX NAME)

Component	Component Registry Number
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=====+=====

Ni	7440-02-0
----	-----------

CeO <sub>2</sub>	1306-38-3
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ZrO <sub>2</sub>	1314-23-4
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CC **72-9** (Electrochemistry)

ST thin layer zirconium dioxide electrolyte; yttrium stabilized zirconia solid electrolyte; hydrogen manuf electrolysis water vapor; **cell electrolytic** zirconia thin film

IT **Electrolytic cells**

(high-temp., with thin layers of solid electrolytes, for hydrogen manuf. from water vapor)

IT 12031-12-8

(anodes from calcium-doped, in high-temp. **electrolytic cells** for hydrogen manuf. from water vapor)

IT 7440-70-2, uses and miscellaneous

(anodes from lanthanum manganese oxide doped with, for high-temp. **electrolytic cells** for hydrogen manuf. from water vapor)

IT 7440-06-4, uses and miscellaneous

(cathodes, for high-temp. **electrolytic cells** for hydrogen manuf. from water vapor)

IT **94270-06-1**

(cathodes, for high-temp. **electrolytic cells** for hydrogen manuf. from water vapor)

IT 7732-18-5, vapor

(electrolysis of, for hydrogen manuf., high-temp. **electrolytic cell** with thin layers of solid electrolyte for)

IT 1305-78-8, uses and miscellaneous

(electrolytes from zirconium dioxide stabilized with, for high-temp. **electrolytic cells** for hydrogen manuf. from water vapor)

IT 1333-74-0P, preparation

(prodn. of, by electrolysis of water vapor, high-temp.  
**electrolytic cells** with thin layers of solid  
electrolytes for)

- IT 1314-23-4, uses and miscellaneous  
(solid electrolytes from yttrium-stabilized, for high-temp.  
**electrolytic cells** for hydrogen manuf. from  
water vapor)
- IT 1314-36-9, uses and miscellaneous 7440-65-5, uses and  
miscellaneous  
(solid electrolytes from zirconium dioxide stabilized with, for  
high-temp. **electrolytic cells** for hydrogen  
manuf. from water vapor)

L57 ANSWER 16 OF 17 HCA COPYRIGHT 2006 ACS on STN

74:60131 Solid solutions of **ceria** as an anode material for  
solid **electrolyte** fuel **cells**. Takahashi,  
Takehiko; Iwahara, Hiroyasu; Ito, Isao (Fac. Eng., Nagoya Univ.,  
Nagoya, Japan). *Denki Kagaku*, 38(7), 509-13 (Japanese) **1970**  
. CODEN: DNKKA2. ISSN: 0366-9440.

- AB The powder of solid solns. of **ceria**, (**CeO<sub>2</sub>**  
)0.6(LaO<sub>1.5</sub>)0.4 or (**CeO<sub>2</sub>**)0.6(YO<sub>1.5</sub>)0.4, mixed with  
turpentine oil was painted onto a disk of stabilized  
**zirconia**, (**ZrO<sub>2</sub>**)0.85(CaO)0.15 or (**ZrO<sub>2</sub>**  
)0.82(YO<sub>1.5</sub>)0.18, while simultaneously embedding a Pt net or a small  
piece of Pt foil as an electronic conductor (collector). This  
assembly was baked at 1200.degree. for 3 hr. Polarization  
characteristics of the **ceria** acting as the anode, with  
**zirconia** as the solid electrolyte, were investigated at  
1000.degree. in H fuel gas. The polarization obsd. was much lower  
and more stable than that obsd. with a Pt anode without  
**ceria**. The strong depolarization effect is due to a mixed  
conduction (**oxygen** ion and **electron**) in the  
solid soln. of **ceria**, presumably caused by a partial redn.  
of **ceria** by H. In this case, the anodic reaction would  
occur at the 2-phase boundary of the mixed conductor (**ceria**  
) and the fuel gas, rather than the 3-phase boundary of electrolyte,  
collector, and the fuel gas.

- IT **1306-38-3**  
(anodes, fuel-cell, coated on **zirconium oxide**  
with platinum collector)

RN 1306-38-3 HCA

CN Cerium oxide (CeO<sub>2</sub>) (8CI, 9CI) (CA INDEX NAME)

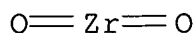


- IT **1314-23-4**, uses and miscellaneous  
(**electrolyte**, fuel-cell, with platinum as

electric conductor)

RN 1314-23-4 HCA

CN Zirconium oxide (ZrO<sub>2</sub>) (8CI, 9CI) (CA INDEX NAME)



CC 77 (Electrochemistry)

ST **ceria** solid solns anodes; anodes **ceria** solid solns; solid solns **ceria** anodes; fuel **cells** solid **electrolytes**; **zirconia** solid electrolytes

IT Fuel cells

(anodes, **cerium oxide**, on stabilized **zirconium oxide** with platinum collector)

IT Anodes

(fuel-cell, stabilized **cerium oxide** coated on **zirconium oxide** electrolyte with platinum collector)

IT **1306-38-3**

(anodes, fuel-cell, coated on **zirconium oxide** with platinum collector)

IT **1314-23-4**, uses and miscellaneous

(**electrolyte**, fuel-cell, with platinum as electric conductor)

L57 ANSWER 17 OF 17 HCA COPYRIGHT 2006 ACS on STN

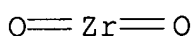
71:87173 Electrode for solid **electrolyte** fuel **cell**.

Tannenberger, Helmut (Compagnie Francaise de Raffinage). S. African ZA 6804674 **19681217**, 14 pp. (English). CODEN: SFXAB. PRIORITY: CH 19670719.

AB Triple-layer porous electrodes are formed for the fuel cell operating at high temp. The cell element is comprised essentially of a thin (100 .mu.) electrolyte layer of mixed oxides of compn. **ZrO<sub>2</sub>** 90 and Yb<sub>2</sub>O<sub>3</sub> 10 mole % and 2 composite porous electrodes. These electrodes each have facing towards the solid electrolyte a rigidly connected layer of 20-.mu. thickness formed of a single layer of approx. spherical-shaped granules of mixed oxides of **ZrO<sub>2</sub>**-Yb<sub>2</sub>O<sub>3</sub>-UO<sub>2</sub> (molar proportion 82:10:8, resp.). The electrode has a 2nd porous layer of Ni (for the anode) and Ag (for the cathode) behind the 1st layer such that each of the granules of the 1st layer being in part covered, on its inside face, by an intermediate layer consisting of the same metal as the corresponding 2nd layer, to assure contact between the 1st and 2nd layers, and thus achieve good cond. without sacrificing porosity. Such a cell element yielded a c.d. of 1.0 amp./cm.<sup>2</sup> under a voltage of 0.5 v. by operating the cell at 800.degree., using air and as fuel, a mixt. of H and CO. The 1st layer of granules of ceramic material which conducts **O** ions and **electrons** can also be formed

from a stabilized **ZrO2** contg. CaO, MgO, Sc2O3, or rare earth oxides. Similarly UO2 in the ternary mixt. can be replaced with **CeO2** or a mixt. thereof. Other materials such as Ni oxides contg. Li oxide, or mixed oxides of Sr, La, and Co can also be used, instead of Ni and Ag.

IT **1314-23-4**, uses and miscellaneous  
(in fuel **cells**, solid **electrolytes** from  
stabilized)  
RN 1314-23-4 HCA  
CN Zirconium oxide (ZrO2) (8CI, 9CI) (CA INDEX NAME)



CC 77 (Electrochemistry)  
ST solid oxide electrolyte; **electrolytes** fuel **cells**  
; fuel **cells** **electrolytes**; oxides fuel  
**cells** **electrolytes**  
IT **1314-23-4**, uses and miscellaneous  
(in fuel **cells**, solid **electrolytes** from  
stabilized)

=> d 158 1-62 ti

L58 ANSWER 1 OF 62 HCA COPYRIGHT 2006 ACS on STN  
TI Catalyst for hydrocarbon partial oxidation, and production method of  
hydrogen-containing gas

L58 ANSWER 2 OF 62 HCA COPYRIGHT 2006 ACS on STN  
TI Composite oxygen ion transport element

L58 ANSWER 3 OF 62 HCA COPYRIGHT 2006 ACS on STN  
TI Membrane-electrode assembly for polymer **electrolyte** fuel  
**cell**

L58 ANSWER 4 OF 62 HCA COPYRIGHT 2006 ACS on STN  
TI Fuel-cell unit cell containing interlayer between solid electrolyte  
and interconnector and its cell stack

L58 ANSWER 5 OF 62 HCA COPYRIGHT 2006 ACS on STN  
TI Method for manufacturing of fuel cells

L58 ANSWER 6 OF 62 HCA COPYRIGHT 2006 ACS on STN  
TI Device for waste gas purification utilizing redox reaction

L58 ANSWER 7 OF 62 HCA COPYRIGHT 2006 ACS on STN

- TI Fuel reforming apparatus for generating hydrogen-rich reforming gas from hydrocarbon
- L58 ANSWER 8 OF 62 HCA COPYRIGHT 2006 ACS on STN
- TI Catalytic membrane reactor with oxygen transport membrane
- L58 ANSWER 9 OF 62 HCA COPYRIGHT 2006 ACS on STN
- TI Hydrogen separation using **oxygen** ion-**electron** mixed conducting membranes
- L58 ANSWER 10 OF 62 HCA COPYRIGHT 2006 ACS on STN
- TI The effect of oxide dopants in ceria on n-butane oxidation
- L58 ANSWER 11 OF 62 HCA COPYRIGHT 2006 ACS on STN
- TI Production of conductive metal oxide mixture
- L58 ANSWER 12 OF 62 HCA COPYRIGHT 2006 ACS on STN
- TI Reduction of greenhouse gas emissions by catalytic processes
- L58 ANSWER 13 OF 62 HCA COPYRIGHT 2006 ACS on STN
- TI Spectroscopic Characterization of Heterogeneity and Redox Effects in Zirconium-Cerium (1:1) Mixed Oxides Prepared by Microemulsion Methods
- L58 ANSWER 14 OF 62 HCA COPYRIGHT 2006 ACS on STN
- TI Supported Zr(Sc)O<sub>2</sub> SOFCs for reduced temperature prepared by slurry coating and co-firing
- L58 ANSWER 15 OF 62 HCA COPYRIGHT 2006 ACS on STN
- TI Oxygen separation process with solid state membranes
- L58 ANSWER 16 OF 62 HCA COPYRIGHT 2006 ACS on STN
- TI Hydrogen generation by ammonia cracking with iron metal-rare earth oxide composite catalyst
- L58 ANSWER 17 OF 62 HCA COPYRIGHT 2006 ACS on STN
- TI Structural characterization and mixed conductivity of TiO<sub>2</sub>-doped ceria stabilized tetragonal zirconia
- L58 ANSWER 18 OF 62 HCA COPYRIGHT 2006 ACS on STN
- TI Physical characteristics and sintering behavior of ultrafine zirconia-ceria powders
- L58 ANSWER 19 OF 62 HCA COPYRIGHT 2006 ACS on STN
- TI Filters contg. pollutant-purification catalysts, air purification apparatus and other commodities employing the filters or catalysts
- L58 ANSWER 20 OF 62 HCA COPYRIGHT 2006 ACS on STN

- TI Electrophoretic forming of functionally graded ceramics
- L58 ANSWER 21 OF 62 HCA COPYRIGHT 2006 ACS on STN  
TI Pt/Ceria WGS catalysts for PEM fuel cell systems
- L58 ANSWER 22 OF 62 HCA COPYRIGHT 2006 ACS on STN  
TI Precursor slurry for solid electrolyte membranes and the electrolyte membranes
- L58 ANSWER 23 OF 62 HCA COPYRIGHT 2006 ACS on STN  
TI Multi-phase solid ion and electron conducting membrane with low volume percentage electron conducting phase and methods for fabricating
- L58 ANSWER 24 OF 62 HCA COPYRIGHT 2006 ACS on STN  
TI Mixed reactant fuel cells with flow through porous electrodes
- L58 ANSWER 25 OF 62 HCA COPYRIGHT 2006 ACS on STN  
TI Characterization of Ce<sub>1-x</sub>Zr<sub>x</sub>O<sub>2</sub> thin films prepared by pyrolytic spray technique
- L58 ANSWER 26 OF 62 HCA COPYRIGHT 2006 ACS on STN  
TI Preparation of Yttria-stabilized t'-phase zirconia for high temperature heating element applications
- L58 ANSWER 27 OF 62 HCA COPYRIGHT 2006 ACS on STN  
TI Ceria-zirconia-supported platinum catalyst for hydrocarbons combustion: low-temperature activity, deactivation and regeneration
- L58 ANSWER 28 OF 62 HCA COPYRIGHT 2006 ACS on STN  
TI Oxygen ion conductive solid state ceramic membranes for catalytic membrane reactors
- L58 ANSWER 29 OF 62 HCA COPYRIGHT 2006 ACS on STN  
TI Optically passive cerium containing counter-electrodes for electrochromic devices
- L58 ANSWER 30 OF 62 HCA COPYRIGHT 2006 ACS on STN  
TI Optical and electrochemical properties of Li<sup>+</sup> intercalated Zr-Ce oxide and Hf-Ce oxide films
- L58 ANSWER 31 OF 62 HCA COPYRIGHT 2006 ACS on STN  
TI Invited paper: phase diagram implications for solid oxide fuel cells
- L58 ANSWER 32 OF 62 HCA COPYRIGHT 2006 ACS on STN  
TI Mixed cerium/titanium and cerium/zirconium oxides as thin-film counter electrodes for solid-state electrochromic transmissive devices

- L58 ANSWER 33 OF 62 HCA COPYRIGHT 2006 ACS on STN  
TI Optical and electrochemical properties of cerium-zirconium mixed oxide thin films deposited by sol-gel and r.f. sputtering
- L58 ANSWER 34 OF 62 HCA COPYRIGHT 2006 ACS on STN  
TI Synthesis of zirconia-based solid electrolyte powders by the coprecipitation technique
- L58 ANSWER 35 OF 62 HCA COPYRIGHT 2006 ACS on STN  
TI Electrochromism in oxide films based on lanthanides
- L58 ANSWER 36 OF 62 HCA COPYRIGHT 2006 ACS on STN  
TI Zr-Ce oxides as candidates for optically passive counterelectrodes
- L58 ANSWER 37 OF 62 HCA COPYRIGHT 2006 ACS on STN  
TI Electron emitter
- L58 ANSWER 38 OF 62 HCA COPYRIGHT 2006 ACS on STN  
TI Novel conducting thin film ceramic membranes for intermediate temperature fuel cells
- L58 ANSWER 39 OF 62 HCA COPYRIGHT 2006 ACS on STN  
TI Low-temperature preparation of nanocrystalline and dispersible metal oxide gels, and the products obtained
- L58 ANSWER 40 OF 62 HCA COPYRIGHT 2006 ACS on STN  
TI Coated membranes
- L58 ANSWER 41 OF 62 HCA COPYRIGHT 2006 ACS on STN  
TI Optical and electrochemical properties of Li<sup>+</sup> intercalated Zr-Ce oxide and Hf-Ce oxide films
- L58 ANSWER 42 OF 62 HCA COPYRIGHT 2006 ACS on STN  
TI **Oxygen** anion- and **electron**-mediating brownmillerite-type, gas-impermeable solid-state membranes, catalytic reactors containing the membranes, process for oxidizing a reactant gas capable of reacting with oxygen, and process for separating oxygen from an oxygen-containing gas
- L58 ANSWER 43 OF 62 HCA COPYRIGHT 2006 ACS on STN  
TI Fuel anodes for high-temperature solid-**electrolyte** fuel **cells**
- L58 ANSWER 44 OF 62 HCA COPYRIGHT 2006 ACS on STN  
TI Device for determination of solubility of metal oxide in melted salts

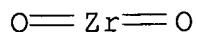


- L58 ANSWER 45 OF 62 HCA COPYRIGHT 2006 ACS on STN  
TI Polarization behavior of nickel-based electrocomposites
- L58 ANSWER 46 OF 62 HCA COPYRIGHT 2006 ACS on STN  
TI Impurity charge states and band-gap shift in **ZrO<sub>2</sub>**-Y<sub>2</sub>O<sub>3</sub>:Co or Ce crystals before and after heat treatment
- L58 ANSWER 47 OF 62 HCA COPYRIGHT 2006 ACS on STN  
TI Electrolytic protection to reduce high-temperature oxidation
- L58 ANSWER 48 OF 62 HCA COPYRIGHT 2006 ACS on STN  
TI Stabilized zirconia solid electrolytes and their manufacture
- L58 ANSWER 49 OF 62 HCA COPYRIGHT 2006 ACS on STN  
TI Electrical properties of zirconia-ceria system
- L58 ANSWER 50 OF 62 HCA COPYRIGHT 2006 ACS on STN  
TI Stabilized zirconia solid electrolyte and its manufacture
- L58 ANSWER 51 OF 62 HCA COPYRIGHT 2006 ACS on STN  
TI Influence of dopant concentration on the electronic conductivity of nonstoichiometric yttria-doped **ceria**
- L58 ANSWER 52 OF 62 HCA COPYRIGHT 2006 ACS on STN  
TI Design and performance of high temperature ceramic electrode modules
- L58 ANSWER 53 OF 62 HCA COPYRIGHT 2006 ACS on STN  
TI Studies of zirconia-ceria base ceramic for MHD channel electrodes
- L58 ANSWER 54 OF 62 HCA COPYRIGHT 2006 ACS on STN  
TI Investigation of the partial charge of oxygen in different types of oxides using an x-ray photoelectron spectroscopic (ESCA) method
- L58 ANSWER 55 OF 62 HCA COPYRIGHT 2006 ACS on STN  
TI Measurement of the oxygen ion transport number in **oxygen ion-electron** mixed conductors
- L58 ANSWER 56 OF 62 HCA COPYRIGHT 2006 ACS on STN  
TI Electrode and insulation materials in magnetohydrodynamic generators
- L58 ANSWER 57 OF 62 HCA COPYRIGHT 2006 ACS on STN  
TI Nature and consequences of current blackening in stabilized **zirconia**
- L58 ANSWER 58 OF 62 HCA COPYRIGHT 2006 ACS on STN  
TI Electron and ion conductivity of the model system (0.75 **CeO<sub>2</sub>** -0.25 **ZrO<sub>2</sub>**)

- L58 ANSWER 59 OF 62 HCA COPYRIGHT 2006 ACS on STN  
TI Energies of formation of defects in the lattices of some oxides with fluorite-type structure
- L58 ANSWER 60 OF 62 HCA COPYRIGHT 2006 ACS on STN  
TI Methods of investigating the nature of conductivity of solid oxides
- L58 ANSWER 61 OF 62 HCA COPYRIGHT 2006 ACS on STN  
TI Production, general properties, and gas absorption of oxide films produced by electron-beam evaporation
- L58 ANSWER 62 OF 62 HCA COPYRIGHT 2006 ACS on STN  
TI Effects of the evaporation products of thermocathode substances, especially barium, on the transformation occurring in metallic oxides during their electronic bombardment

=> d 158 9,11,25,29,32,33,34,36,41,48,49,50,53,55 cbib abs hitstr hitind

- L58 ANSWER 9 OF 62 HCA COPYRIGHT 2006 ACS on STN  
139:339909 Hydrogen separation using **oxygen** ion-  
**electron** mixed conducting membranes. Gopalan, Srikanth  
(Trustees of Boston University, USA). PCT Int. Appl. WO 2003089117  
A1 **20031030**, 25 pp. DESIGNATED STATES: W: AE, AG, AL,  
AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ,  
DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL,  
IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD,  
MG, MK, MN, MW, MX, MZ, NI, NO, NZ, OM, PH, PL, PT, RO, RU, SC, SD,  
SE, SG, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU,  
ZA, ZM, ZW; RW: AT, BE, BF, BJ, CF, CG, CH, CI, CM, CY, DE, DK, ES,  
FI, FR, GA, GB, GR, IE, IT, LU, MC, ML, MR, NE, NL, PT, SE, SN, TD,  
TG, TR. (English). CODEN: PIXXD2. APPLICATION: WO 2003-US11166  
20030415. PRIORITY: US 2002-PV373531 20020418.
- AB Hydrogen is sepd. from a stream of synthesis gas or other reformat  
gases at approx. 800-1000.degree., using a cell in which a mixt. of  
reformat gas and steam are passed on one side of a dense solid  
state ceramic membrane, while steam is passed on the other side.  
High purity hydrogen is generated on the steam side. The membrane  
is similar to one that has in the past been used for oxygen purifn.  
and can be single or two phase, for example La0.9Sr0.1Ga0.8Mg0.2O3 +  
Pd.
- IT **1314-23-4, Zirconia**, uses  
(doped; hydrogen sepn. using **oxygen** ion-  
**electron** mixed conducting membranes)
- RN 1314-23-4 HCA  
CN Zirconium oxide (ZrO2) (8CI, 9CI) (CA INDEX NAME)



IT **1306-38-3, Cerium oxide (CeO<sub>2</sub>)**, uses  
 (hydrogen sepn. using **oxygen ion-electron**  
 mixed conducting membranes)  
 RN 1306-38-3 HCA  
 CN Cerium oxide (CeO<sub>2</sub>) (8CI, 9CI) (CA INDEX NAME)

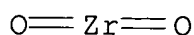


IC ICM B01D053-22  
 ICS B01D071-02  
 CC 51-11 (Fossil Fuels, Derivatives, and Related Products)  
 Section cross-reference(s): 49  
 IT Transition metal oxides  
 (dopant; hydrogen sepn. using **oxygen ion-**  
**electron** mixed conducting membranes)  
 IT Ceramic membranes  
 Fuel gas manufacturing  
 Steam reforming  
 Synthesis gas  
 (hydrogen sepn. using **oxygen ion-electron**  
 mixed conducting membranes)  
 IT Hydrocarbons, processes  
 (hydrogen sepn. using **oxygen ion-electron**  
 mixed conducting membranes)  
 IT 1308-38-9, Chromium oxide (Cr<sub>2</sub>O<sub>3</sub>), uses 1313-13-9, Manganese oxide  
 (MnO<sub>2</sub>), uses 1345-25-1, Ferrous oxide, uses 7440-24-6,  
 Strontium, uses 13463-67-7, Titanium dioxide, uses  
 (dopant; hydrogen sepn. using **oxygen ion-**  
**electron** mixed conducting membranes)  
 IT **1314-23-4, Zirconia**, uses  
 (doped; hydrogen sepn. using **oxygen ion-**  
**electron** mixed conducting membranes)  
 IT 74-98-6, Propane, processes 106-97-8, Butane, processes  
 111-65-9, Octane, processes 630-08-0, Carbon monoxide, processes  
 (hydrogen sepn. using **oxygen ion-electron**  
 mixed conducting membranes)  
 IT 1314-37-0, Ytterbium oxide 7440-02-0, Nickel, uses 7440-05-3,  
 Palladium, uses 7440-06-4, Platinum, uses 7440-22-4, Silver,  
 uses 7440-57-5, Gold, uses 12060-08-1, Scandium oxide  
 12064-62-9, Gadolinium oxide  
 (hydrogen sepn. using **oxygen ion-electron**  
 mixed conducting membranes)  
 IT 1333-74-0P, Hydrogen, preparation

- (hydrogen sepn. using **oxygen ion-electron** mixed conducting membranes)
- IT 74-82-8, Methane, reactions  
(hydrogen sepn. using **oxygen ion-electron** mixed conducting membranes)
- IT **1306-38-3, Cerium oxide (CeO<sub>2</sub>)**, uses 7440-37-1, Argon, uses 7440-59-7, Helium, uses 7727-37-9, Nitrogen, uses 155343-26-3  
(hydrogen sepn. using **oxygen ion-electron** mixed conducting membranes)
- IT 64886-84-6, Cobalt iron Lanthanum oxide  
(strontium-doped; hydrogen sepn. using **oxygen ion-electron** mixed conducting membranes)
- IT 1314-36-9, Yttria, uses  
(**zirconia** stabilized by; hydrogen sepn. using **oxygen ion-electron** mixed conducting membranes)
- L58 ANSWER 11 OF 62 HCA COPYRIGHT 2006 ACS on STN  
139:309501 Production of conductive metal oxide mixture. Sumita, Tatsuo; Kobayashi, Kiyoshi (National Institute of Advanced Industrial Science and Technology, Japan). Jpn. Kokai Tokkyo Koho JP 2003286010 A2 **20031007**, 7 pp. (Japanese). CODEN: JKXXAF. APPLICATION: JP 2002-88252 20020327.
- AB The mixt. consists of oxygen ion conductive metal oxides and elec. conductive metal oxides having thermodynamical equil. among the oxides. The method produces various types of oxide mixt. having oxygen ion and elec. conductivities by controlling the combination and the compn. ratio of starting metal oxides. The products have excellent sintering, molding, processable characteristics, and are suitable for O<sub>2</sub> permeable and O<sub>2</sub> enrichment materials.
- IT **1306-38-3, Cerium Oxide**, uses  
**1314-23-4, Zirconium Oxide**, uses  
(prodn. of conductive metal oxide mixt.)
- RN 1306-38-3 HCA  
CN Cerium oxide (CeO<sub>2</sub>) (8CI, 9CI) (CA INDEX NAME)



- RN 1314-23-4 HCA  
CN Zirconium oxide (ZrO<sub>2</sub>) (8CI, 9CI) (CA INDEX NAME)



- IC ICM C01B013-18  
ICS C01B013-02; C01G003-00; C01G009-00; C04B035-50; H01B001-08  
CC 49-3 (Industrial Inorganic Chemicals)

ST metal oxide mixt **oxygen** ion **electron** cond  
 IT 64-17-5, Ethanol, uses **1306-38-3, Cerium Oxide**, uses 1308-87-8, Dysprosium Oxide 1308-96-9, Europium Oxide 1312-43-2, Indium Oxide 1313-97-9, Neodymium Oxide 1313-99-1, Nickel Oxide, uses 1314-13-2, Zinc Oxide, uses **1314-23-4, Zirconium Oxide**, uses 1314-36-9, Yttrium Oxide, uses 1314-37-0, Ytterbium Oxide 1317-34-6, Manganese Oxide (Mn2O3) 1317-38-0, Copper Oxide, uses 9002-89-5, Polyvinyl alcohol 12024-21-4, Gallium Oxide 12055-62-8, Holmium Oxide 12060-58-1, Samarium Oxide 37275-76-6, Aluminum zinc oxide 51184-16-8, Cerium yttrium oxide 55575-05-8, Cerium neodymium oxide 124386-52-3, Cerium copper neodymium oxide (prodn. of conductive metal oxide mixt.)

L58 ANSWER 25 OF 62 HCA COPYRIGHT 2006 ACS on STN

135:159202 Characterization of Ce<sub>1-x</sub>Zr<sub>x</sub>O<sub>2</sub> thin films prepared by pyrolytic spray technique. Elidrissi, B.; Addou, M.; Regragui, M.; Mzerd, A.; Bougrine, A.; Kachouane, A. (Faculte des Sciences, Departement de Physique, Laboratoire d'Opto-Electronique et de Physico-Chimie des Materiaux, Kenitra, Morocco). Solid State Ionics, 140(3,4), 369-374 (English) **2001**. CODEN: SSIOD3. ISSN: 0167-2738. Publisher: Elsevier Science B.V..

AB It was demonstrated that spray pyrolysis can be used to prep. Ce<sub>1-x</sub>Zr<sub>x</sub>O<sub>2</sub> thin films with x between 0 and 1. The compn. of these films was detd. by electron probe microanal. (EPMA), and the cryst. structure by X-ray diffraction (XRD) and Raman spectroscopy (RS). Cyclic voltammetry (CV) was performed in an electrolyte of propylene carbonate with 1 M LiClO<sub>4</sub>. Films with high Zr content were incapable of charge exchange of Li<sup>+</sup> ions. In the contrast, films with high Ce content were found to be able to insert/ext. large charge densities of Li<sup>+</sup> ions. They also remained transparent during Li<sup>+</sup> intercalation.

IT **135495-52-2P**, Cerium zirconium oxide ((Ce,Zr)O<sub>2</sub>)  
**213667-74-4P**, Cerium zirconium oxide Ce<sub>0.81</sub>Zr<sub>0.19</sub>O<sub>2</sub>  
**352711-60-5P**, Cerium zirconium oxide (Ce<sub>0.54</sub>Zr<sub>0.46</sub>O<sub>2</sub>)  
**352711-61-6P**, Cerium zirconium oxide (Ce<sub>0.23</sub>Zr<sub>0.77</sub>O<sub>2</sub>)  
 (characterization of Ce<sub>1-x</sub>Zr<sub>x</sub>O<sub>2</sub> thin films prep'd. by pyrolytic spray technique)

RN 135495-52-2 HCA

CN Cerium zirconium oxide ((Ce,Zr)O<sub>2</sub>) (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
O	2	17778-80-2
Zr	0 - 1	7440-67-7
Ce	0 - 1	7440-45-1

RN 213667-74-4 HCA  
 CN Cerium zirconium oxide (Ce<sub>0.81</sub>Zr<sub>0.19</sub>O<sub>2</sub>) (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
O	2	17778-80-2
Zr	0.19	7440-67-7
Ce	0.81	7440-45-1

RN 352711-60-5 HCA  
 CN Cerium zirconium oxide (Ce<sub>0.54</sub>Zr<sub>0.46</sub>O<sub>2</sub>) (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
O	2	17778-80-2
Zr	0.46	7440-67-7
Ce	0.54	7440-45-1

RN 352711-61-6 HCA  
 CN Cerium zirconium oxide (Ce<sub>0.23</sub>Zr<sub>0.77</sub>O<sub>2</sub>) (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
O	2	17778-80-2
Zr	0.77	7440-67-7
Ce	0.23	7440-45-1

CC **72-2** (Electrochemistry)  
 Section cross-reference(s): 73, 75  
 IT **135495-52-2P**, Cerium zirconium oxide ((Ce,Zr)O<sub>2</sub>)  
**213667-74-4P**, Cerium zirconium oxide Ce<sub>0.81</sub>Zr<sub>0.19</sub>O<sub>2</sub>  
**352711-60-5P**, Cerium zirconium oxide (Ce<sub>0.54</sub>Zr<sub>0.46</sub>O<sub>2</sub>)  
**352711-61-6P**, Cerium zirconium oxide (Ce<sub>0.23</sub>Zr<sub>0.77</sub>O<sub>2</sub>)  
 (characterization of Ce<sub>1-x</sub>Zr<sub>x</sub>O<sub>2</sub> thin films prep'd. by pyrolytic  
 spray technique)

L58 ANSWER 29 OF 62 HCA COPYRIGHT 2006 ACS on STN  
 132:99494 Optically passive cerium containing counter-electrodes for  
 electrochromic devices. Varsano, F.; Decker, F.; Masetti, E.  
 (University of Rome "La Sapienza" Chemistry Dep., Rome, 5I-00185,  
 Italy). Ionics, 5(1 & 2), 80-85 (English) **1999**. CODEN:  
 IONIFA. ISSN: 0947-7047. Publisher: Institute for Ionics.  
 AB Electrochem. and optical behavior of sputter deposited CeO<sub>2</sub>, Ce-Zr  
 mixed oxide and Ce-V mixed oxide thin films are reported. The films  
 were deposited starting from a target prep'd. by mixing and weakly

pressing the oxide powders in the desired molar ratio. Li intercalation was accomplished from a liq. electrolyte. CeO<sub>2</sub> and Ce-Zr mixed oxide thin films are transparent in the visible range and behave as passive material upon oxidn./redn. During the cyclic voltammetries performed on the thin films a charge of few mC was reversibly cycled. The diffusion coeff. was evaluated from galvanostatic intermittent titrn. technique (GITT) expts. Ce-V mixed oxide thin films showed a mixed anodic/cathodic behavior passing through a transparent state. The charge reversibly inserted during cyclic voltammetry at 10 mV/s was .ltoreq.22 mC/cm<sup>2</sup> for a 107 nm thick film and ranks Ce-V mixed oxide among the most promising materials for electrochromic devices.

IT **65453-23-8**, Cerium zirconium oxide  
(electrochem. and optical behavior of sputter deposited CeO<sub>2</sub>, Ce-Zr mixed oxide and Ce-V mixed oxide thin film: optically passive cerium contg. counter-electrodes for electrochromic devices)

RN 65453-23-8 HCA

CN Cerium zirconium oxide (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
=====	=====	=====
O	x	17778-80-2
Zr	x	7440-67-7
Ce	x	7440-45-1

CC **72-2** (Electrochemistry)

Section cross-reference(s): 73, 74, 78

IT 1306-38-3, Cerium oxide (CeO<sub>2</sub>), uses 12643-01-5, Cerium vanadium oxide **65453-23-8**, Cerium zirconium oxide  
(electrochem. and optical behavior of sputter deposited CeO<sub>2</sub>, Ce-Zr mixed oxide and Ce-V mixed oxide thin film: optically passive cerium contg. counter-electrodes for electrochromic devices)

L58 ANSWER 32 OF 62 HCA COPYRIGHT 2006 ACS on STN

131:136702 Mixed cerium/titanium and cerium/zirconium oxides as thin-film counter electrodes for solid-state electrochromic transmissive devices. Macrelli, Guglielmo; Poli, Elisabetta (R and D Department via A. Volta, Isoclima SpA, Este, 35042, Italy). Electrochimica Acta, 44(18), 3137-3147 (English) **1999**. CODEN: ELCAAV. ISSN: 0013-4686. Publisher: Elsevier Science Ltd..

AB Optically passive thin films of mixed cerium/titanium and cerium/zirconium oxides were prepd. by electron-beam reactive evapn. Different oxidn. levels were achieved using different oxygen flows in the deposition process. The samples were optically and electrochem. characterized. Performances are discussed in view of

utilization in electrochromic devices as thin-film counter electrodes. Different materials were tested to identify the best soln. to be used as optically passive ion storage layers in existing electrochromic devices in alternative to optically active V2O5 counter electrodes. Process conditions and materials performances are reported, related to each other and discussed. Development studies are still in progress towards the optimization of the devices and their future scaling up.

IT **65453-23-8P**, Cerium zirconium oxide  
 (films; prepd. by electron-beam CVD and used as counter electrodes for electrochromic devices)  
 RN 65453-23-8 HCA  
 CN Cerium zirconium oxide (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
=====	=====	=====
O	x	17778-80-2
Zr	x	7440-67-7
Ce	x	7440-45-1

CC 74-9 (Radiation Chemistry, Photochemistry, and Photographic and Other Reprographic Processes)  
 Section cross-reference(s): **72**

IT 39406-95-6P, Cerium titanium oxide **65453-23-8P**, Cerium zirconium oxide  
 (films; prepd. by electron-beam CVD and used as counter electrodes for electrochromic devices)

L58 ANSWER 33 OF 62 HCA COPYRIGHT 2006 ACS on STN

131:122842 Optical and electrochemical properties of cerium-zirconium mixed oxide thin films deposited by sol-gel and r.f. sputtering. Varsano, F.; Decker, F.; Masetti, E.; Cardellini, F.; Licciulli, A. (Department of Chemistry, University of Rome 'La Sapienza', Rome, 00185, Italy). Electrochimica Acta, 44(18), 3149-3156 (English) **1999**. CODEN: ELCAAV. ISSN: 0013-4686. Publisher: Elsevier Science Ltd..

AB Films of Ce-Zr mixed oxide were produced by sol-gel and r.f. sputtering. These films can be used as 'passive' counter-electrodes in electrochromic smart windows because they retain their full transparency in both the oxidized and reduced state. Li intercalation was accomplished electrochem. using a liq. electrolyte. Electrochem. behavior of the samples was found to be dependent on the heat treatment (sol-gel deposited film) and crystallite orientation (sputter deposited films). XRD anal. on sputter deposited films showed that the films are cryst. and grow following the orientation of the underlying tin doped indium oxide (ITO) film. Films of Ce-Zr mixed oxide lacking in (111) crystallite



orientation show continuous evolution of the voltammograms and reach a max. value for the cycled charge only after a large no. of cycles. The lithium diffusion coeff., calcd. from GITT measurements, is in the range 10-12-10-14 cm<sup>2</sup>-s-1 for sputter deposited films and becomes as low as 10-15 cm<sup>2</sup>-s-1 for sol-gel deposited films. Optical consts. of the thin films were calcd. from reflectance and transmittance spectra. Refractive index values are in the range of 2.15-2.30 at  $\lambda = 633$  nm depending on the deposition method. A sharp absorption edge at about 320 nm is seen in accordance with CeO<sub>2</sub> optical properties.

IT **65453-23-8**, Cerium zirconium oxide  
 (optical and electrochem. properties of cerium-zirconium mixed  
 oxide thin films deposited by sol-gel and r.f. sputtering)  
 RN 65453-23-8 HCA  
 CN Cerium zirconium oxide (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
=====	=====	=====
O	x	17778-80-2
Zr	x	7440-67-7
Ce	x	7440-45-1

CC 74-9 (Radiation Chemistry, Photochemistry, and Photographic and  
 Other Reprographic Processes)  
 Section cross-reference(s): **72**, 73

IT 1306-38-3, Ceria, properties 1314-23-4, Zirconia, properties  
**65453-23-8**, Cerium zirconium oxide  
 (optical and electrochem. properties of cerium-zirconium mixed  
 oxide thin films deposited by sol-gel and r.f. sputtering)

L58 ANSWER 34 OF 62 HCA COPYRIGHT 2006 ACS on STN

130:199846 Synthesis of zirconia-based solid electrolyte powders by the  
 coprecipitation technique. Muccillo, E. N. S.; Muccillo, R.; Avila,  
 D. M. (Instituto Pesquisas Energeticas Nucleares, Comissao Nacional  
 Energia Nuclear, Sao Paulo, 05422, Brazil). Materials Science  
 Forum, 299-300(Advanced Powder Technology), 70-79 (English)  
**1999**. CODEN: MSFOEP. ISSN: 0255-5476. Publisher: Trans  
 Tech Publications Ltd..

AB The copptn. technique was used to obtain ZrO<sub>2</sub>-MgO (from ZrOCl<sub>2</sub> +  
 MgCl<sub>2</sub>) and ZrO<sub>2</sub>-CeO<sub>2</sub> (from ZrOCl<sub>2</sub> + Ce(NO<sub>3</sub>)<sub>3</sub>) powders with suitable  
 purity and sinterability, resp. The powder mixing technique was  
 used for comparison purposes. Cylindrical pellets were prepd. by  
 uniaxial and cold isostatic pressing. The characterization of the  
 sintered pellets were carried out by impedance spectroscopy (at 472  
 and 460.degree.), SEM, and XRD. ZrO<sub>2</sub>-MgO ceramics with a high  
 degree of purity were obtained (sintering performed at 1450.degree.  
 for 2 h, followed by 1700.degree. for 1 h in air). For the

ZrO<sub>2</sub>-CeO<sub>2</sub> system, sintered pellets (1500.degree., 2 h) with 98% of the theor. d., and 0.5 .mu.m av. grain size were obtained.

IT **65453-23-8P**, Cerium zirconium oxide  
(prepn. of zirconia-based solid electrolyte powders by copptn. technique)  
RN 65453-23-8 HCA  
CN Cerium zirconium oxide (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
=====	=====	=====
O	x	17778-80-2
Zr	x	7440-67-7
Ce	x	7440-45-1

CC 57-2 (Ceramics)  
Section cross-reference(s): **52**  
IT 39318-32-6P, Magnesium zirconium oxide **65453-23-8P**, Cerium zirconium oxide  
(prepn. of zirconia-based solid electrolyte powders by copptn. technique)

L58 ANSWER 36 OF 62 HCA COPYRIGHT 2006 ACS on STN  
130:175737 Zr-Ce oxides as candidates for optically passive counterelectrodes. Veszelei, M.; Mattsson, M. Stromme; Kullman, L.; Azens, A.; Granqvist, C. G. (The Angstrom Laboratory, Department of Materials Science, Uppsala University, Uppsala, S-75121, Swed.). Solar Energy Materials and Solar Cells, 56(3-4), 223-230 (English) **1999**. CODEN: SEMCEQ. ISSN: 0927-0248. Publisher: Elsevier Science B.V..

AB Zr-Ce oxide films with compns. from pure Zr oxide to pure Ce oxide were made by reactive d.c. magnetron co-sputtering. The compn. and structure were detd. by RBS and x-ray diffraction. Pure Ce oxide films have high charge capacity and are optically passive under charge insertion; they are, however, chem. unstable in an electrolyte of LiClO<sub>4</sub> in propylene carbonate. Pure Zr oxide has practically zero charge capacity. Zr-Ce oxide films have high (above 80%) optical transmittance, high charge capacity, and good chem. stability. These films remain fully transparent irresp. of their degree of lithiation, which may be reconciled with electrons accommodating 4f-states of Ce.

IT **135495-52-2**, Cerium zirconium oxide ((Ce,Zr)O<sub>2</sub>)  
(as optically passive counterelectrodes)  
RN 135495-52-2 HCA  
CN Cerium zirconium oxide ((Ce,Zr)O<sub>2</sub>) (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number

O	2	17778-80-2
Zr	0 - 1	7440-67-7
Ce	0 - 1	7440-45-1

CC 76-2 (Electric Phenomena)

Section cross-reference(s): 52, 74

IT **135495-52-2**, Cerium zirconium oxide ((Ce,Zr)O<sub>2</sub>)  
(as optically passive counterelectrodes)

L58 ANSWER 41 OF 62 HCA COPYRIGHT 2006 ACS on STN

128:197990 Optical and electrochemical properties of Li<sup>+</sup> intercalated Zr-Ce oxide and Hf-Ce oxide films. Veszelei, M.; Kullman, L.; Stro/mme Mattsson, M.; Azens, A.; Granqvist, C. G. (Department of Materials Science, Uppsala University, P.O. Box 534, Uppsala, S-751 21, Swed.). Journal of Applied Physics, 83(3), 1670-1676 (English) **1998**. CODEN: JAPIAU. ISSN: 0021-8979. Publisher: American Institute of Physics.

AB Sputter deposited Zr-Ce oxide and Hf-Ce oxide films were studied with regard to structure, optical absorption, and electrochem. properties. X-ray diffractometry and Rutherford backscattering spectrometry showed that polycryst. Zr-Ce oxide and Hf-Ce oxide films had cubic crystal structures for 40-100 mol CeO<sub>2</sub> and 50-100 mol CeO<sub>2</sub>, resp. Cyclic voltammetry was performed in an electrolyte of propylene carbonate contg. LiClO<sub>4</sub>. The charge capacity was .apprx.60 mC/cm<sup>2</sup>.mu.m for a Zr-Ce oxide film with a Ce/Zr atom ratio of .apprx.13 as well as for a Hf-Ce oxide film with a Ce/Hf atom ratio of .apprx.2. A decrease of the charge capacity was noted after .apprx.1000 voltammetric cycles, with the mixed oxide films being far more stable than CeO<sub>2</sub>. In situ optical transmittance measurements showed that both Zr-Ce and Hf-Ce oxide films remained essentially transparent during Li<sup>+</sup> intercalation. Chronopotentiometry measurements were used to elucidate effects of the electronic structure during Li<sup>+</sup> intercalation.

IT **39319-49-8D**, Cerium zirconium oxide (Ce<sub>0.4</sub>Zr<sub>0.6</sub>O<sub>2</sub>), oxygen excess **53169-24-7D**, Cerium zirconium oxide (Ce<sub>0.5</sub>Zr<sub>0.5</sub>O<sub>2</sub>), oxygen excess **65453-23-8D**, Cerium zirconium oxide, oxygen excess **115232-99-0D**, Cerium zirconium oxide (Ce<sub>0.75</sub>Zr<sub>0.25</sub>O<sub>2</sub>), oxygen excess **140418-71-9D**, Cerium zirconium oxide (Ce<sub>0.6</sub>Zr<sub>0.4</sub>O<sub>2</sub>), oxygen excess **182264-32-0D**, Cerium zirconium oxide (Ce<sub>0.93</sub>Zr<sub>0.07</sub>O<sub>2</sub>), oxygen excess **203713-40-0D**, Cerium zirconium oxide (Ce<sub>0.94</sub>Zr<sub>0.06</sub>O<sub>2</sub>), oxygen excess **203713-41-1D**, Cerium zirconium oxide (Ce<sub>0.86</sub>Zr<sub>0.14</sub>O<sub>2</sub>), oxygen excess **203713-42-2D**, Cerium zirconium oxide (Ce<sub>0.46</sub>Zr<sub>0.54</sub>O<sub>2</sub>), oxygen excess (optical and electrochem. properties of lithium monocation intercalated cerium zirconium oxide and cerium hafnium oxide films)

RN 39319-49-8 HCA  
 CN Cerium zirconium oxide (Ce<sub>0.4</sub>Zr<sub>0.6</sub>O<sub>2</sub>) (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
O	2	17778-80-2
Zr	0.6	7440-67-7
Ce	0.4	7440-45-1

RN 53169-24-7 HCA  
 CN Cerium zirconium oxide (CeZrO<sub>4</sub>) (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
O	4	17778-80-2
Zr	1	7440-67-7
Ce	1	7440-45-1

RN 65453-23-8 HCA  
 CN Cerium zirconium oxide (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
O	x	17778-80-2
Zr	x	7440-67-7
Ce	x	7440-45-1

RN 115232-99-0 HCA  
 CN Cerium zirconium oxide (Ce<sub>0.75</sub>Zr<sub>0.25</sub>O<sub>2</sub>) (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
O	2	17778-80-2
Zr	0.25	7440-67-7
Ce	0.75	7440-45-1

RN 140418-71-9 HCA  
 CN Cerium zirconium oxide (Ce<sub>0.6</sub>Zr<sub>0.4</sub>O<sub>2</sub>) (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
O	2	17778-80-2
Zr	0.4	7440-67-7

Ce | 0.6 | 7440-45-1

RN 182264-32-0 HCA

CN Cerium zirconium oxide (Ce<sub>0.93</sub>Zr<sub>0.07</sub>O<sub>2</sub>) (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
O	2	17778-80-2
Zr	0.07	7440-67-7
Ce	0.93	7440-45-1

RN 203713-40-0 HCA

CN Cerium zirconium oxide (Ce<sub>0.94</sub>Zr<sub>0.06</sub>O<sub>2</sub>) (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
O	2	17778-80-2
Zr	0.06	7440-67-7
Ce	0.94	7440-45-1

RN 203713-41-1 HCA

CN Cerium zirconium oxide (Ce<sub>0.86</sub>Zr<sub>0.14</sub>O<sub>2</sub>) (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
O	2	17778-80-2
Zr	0.14	7440-67-7
Ce	0.86	7440-45-1

RN 203713-42-2 HCA

CN Cerium zirconium oxide (Ce<sub>0.46</sub>Zr<sub>0.54</sub>O<sub>2</sub>) (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
O	2	17778-80-2
Zr	0.54	7440-67-7
Ce	0.46	7440-45-1

CC 73-3 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)

Section cross-reference(s): **72**, 75, 76

IT 1306-38-3D, Cerium oxide (CeO<sub>2</sub>), oxygen excess, properties

1314-23-4D, Zirconium oxide (ZrO<sub>2</sub>), oxygen excess, properties

12055-23-1D, Hafnium oxide (HfO<sub>2</sub>), oxygen excess **39319-49-8D**

, Cerium zirconium oxide (Ce<sub>0.4</sub>Zr<sub>0.6</sub>O<sub>2</sub>), oxygen excess  
**53169-24-7D**, Cerium zirconium oxide (Ce<sub>0.5</sub>Zr<sub>0.5</sub>O<sub>2</sub>), oxygen  
 excess **65453-23-8D**, Cerium zirconium oxide, oxygen excess  
 104365-48-2D, Hafnium zirconium oxide, oxygen excess  
**115232-99-0D**, Cerium zirconium oxide (Ce<sub>0.75</sub>Zr<sub>0.25</sub>O<sub>2</sub>),  
 oxygen excess 116098-16-9D, Hafnium zirconium oxide  
 (Hf<sub>0.5</sub>Zr<sub>0.5</sub>O<sub>2</sub>), oxygen excess **140418-71-9D**, Cerium  
 zirconium oxide (Ce<sub>0.6</sub>Zr<sub>0.4</sub>O<sub>2</sub>), oxygen excess **182264-32-0D**  
 , Cerium zirconium oxide (Ce<sub>0.93</sub>Zr<sub>0.07</sub>O<sub>2</sub>), oxygen excess  
**203713-40-0D**, Cerium zirconium oxide (Ce<sub>0.94</sub>Zr<sub>0.06</sub>O<sub>2</sub>),  
 oxygen excess **203713-41-1D**, Cerium zirconium oxide  
 (Ce<sub>0.86</sub>Zr<sub>0.14</sub>O<sub>2</sub>), oxygen excess **203713-42-2D**, Cerium  
 zirconium oxide (Ce<sub>0.46</sub>Zr<sub>0.54</sub>O<sub>2</sub>), oxygen excess 203713-43-3D,  
 Hafnium zirconium oxide (Hf<sub>0.67</sub>Zr<sub>0.33</sub>O<sub>2</sub>), oxygen excess  
 203713-44-4D, Hafnium zirconium oxide (Hf<sub>0.33</sub>Zr<sub>0.67</sub>O<sub>2</sub>), oxygen  
 excess

(optical and electrochem. properties of lithium monocation  
 intercalated cerium zirconium oxide and cerium hafnium oxide  
 films)

L58 ANSWER 48 OF 62 HCA COPYRIGHT 2006 ACS on STN

117:154544 Stabilized zirconia solid electrolytes and their manufacture.  
 Iwasaki, Hiroyuki; Yoshida, Toshihiko; Tagaya, Noriaki; Mukaisawa,  
 Isao; Sakurada, Satoshi (Tonen Corp., Japan; Zaidan Hojin Sekiyu  
 Sangyo Kasseika Center). Jpn. Kokai Tokkyo Koho JP 04139063 A2  
**19920513** Heisei, 7 pp. (Japanese). CODEN: JKXXAF.  
 APPLICATION: JP 1990-262650 19900929.

AB The electrolytes are stabilized ZrO<sub>2</sub> contg. metal oxides forming a  
 solid soln. of with the stabilized ZrO<sub>2</sub> at the intergranular  
 boundary phase of the stabilized ZrO<sub>2</sub> particles. The electrolytes  
 are prepd. by mixing stabilized ZrO<sub>2</sub> powder with metal alkoxides,  
 metal salts, or submicron metal or metal oxide powder, shaping the  
 mixt., and sintering. Y<sub>2</sub>O<sub>3</sub>-stabilized ZrO<sub>2</sub> electrolytes contg. CeO<sub>2</sub>  
 and MgO had higher strength than those without the additives, and  
 are useful for fuel cells.

IT **127860-57-5**, Cerium zirconium oxide (Ce<sub>0.12</sub>Zr<sub>0.88</sub>O<sub>2</sub>)  
 (electrolytes contg., stabilized zirconia, for fuel cells, for  
 strength)

RN 127860-57-5 HCA

CN Cerium zirconium oxide (Ce<sub>0.12</sub>Zr<sub>0.88</sub>O<sub>2</sub>) (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
O	2	17778-80-2
Zr	0.88	7440-67-7
Ce	0.12	7440-45-1

IC ICM C04B035-48  
ICS H01M008-12

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

ST fuel **cell** zirconia **electrolyte**; magnesia  
zirconia fuel **cell** **electrolyte**; ceria zirconia  
fuel **cell** **electrolyte**; yttria stabilized  
zirconia electrolyte

IT Fuel-**cell** **electrolytes**  
(zirconia, stabilized, ceria and magnesia in, for strength)

IT 1306-38-3, Cerium dioxide, uses 1309-48-4, Magnesia, uses  
116590-73-9, Magnesium zirconium oxide (Mg0.09Zr0.91O1.91)  
121130-03-8, Cerium yttrium oxide (Ce0.85Y0.15O1.93)  
**127860-57-5**, Cerium zirconium oxide (Ce0.12Zr0.88O2)  
(electrolytes contg., stabilized zirconia, for fuel cells, for  
strength)

IT 64417-98-7, Yttrium zirconium oxide  
(**electrolytes**, for fuel **cells**, ceria and  
magnesia in, for strength)

IT 1314-23-4, Zirconia, uses  
(yttria-stabilized, **electrolytes**, for fuel  
**cells**, ceria and magnesia in, for strength)

IT 1314-36-9, Yttria, uses  
(zirconia stabilized with, **electrolytes**, for fuel  
**cells**, ceria and magnesia in, for strength)

L58 ANSWER 49 OF 62 HCA COPYRIGHT 2006 ACS on STN  
116:177632 Electrical properties of zirconia-ceria system. Chiodelli,  
G.; Magistris, A.; Scagliotti, M. (CSTE, CNR, Pavia, 27100, Italy).  
Comm. Eur. Communities, [Rep.] EUR, EUR 13564, Proc. Int. Symp.  
Solid Oxide Fuel Cells, 2nd, 1991, 417-20 (English) **1991**.  
CODEN: CECED9. ISSN: 0303-755X.

AB In the ZrO<sub>2</sub>:CeO<sub>2</sub> system, the elec. properties of 50-90 mol% CeO<sub>2</sub>  
compn. range have been investigated by using impedance spectroscopy  
under different O partial pressures (from air to 10<sup>-4</sup> atm). The  
ionic transference no. at high temp. (700-1000.degree.) has been  
measured by the open circuit emf. method applied under O pressure  
gradient. Owing to their elec. properties, they have been proposed  
as solid electrolytes for solid oxide fuel cells, O semipermeable  
membranes for steam electrolysis, and hot electrodes for MHD  
systems.

IT **53169-24-7**, Cerium zirconium oxide (CeZrO<sub>4</sub>)  
**140418-71-9**, Cerium zirconium oxide (Ce<sub>0.6</sub>Zr<sub>0.4</sub>O<sub>2</sub>)  
**140418-72-0**, Cerium zirconium oxide (Ce<sub>0.7</sub>Zr<sub>0.3</sub>O<sub>2</sub>)  
**140418-73-1**, Cerium zirconium oxide (Ce<sub>0.8</sub>Zr<sub>0.2</sub>O<sub>2</sub>)  
**140418-74-2**, Cerium zirconium oxide (Ce<sub>0.9</sub>Zr<sub>0.1</sub>O<sub>2</sub>)  
(elec. properties of)

RN 53169-24-7 HCA

CN Cerium zirconium oxide (CeZrO<sub>4</sub>) (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
=====	=====	=====
O	4	17778-80-2
Zr	1	7440-67-7
Ce	1	7440-45-1

RN 140418-71-9 HCA

CN Cerium zirconium oxide (Ce<sub>0.6</sub>Zr<sub>0.4</sub>O<sub>2</sub>) (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
=====	=====	=====
O	2	17778-80-2
Zr	0.4	7440-67-7
Ce	0.6	7440-45-1

RN 140418-72-0 HCA

CN Cerium zirconium oxide (Ce<sub>0.7</sub>Zr<sub>0.3</sub>O<sub>2</sub>) (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
=====	=====	=====
O	2	17778-80-2
Zr	0.3	7440-67-7
Ce	0.7	7440-45-1

RN 140418-73-1 HCA

CN Cerium zirconium oxide (Ce<sub>0.8</sub>Zr<sub>0.2</sub>O<sub>2</sub>) (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
=====	=====	=====
O	2	17778-80-2
Zr	0.2	7440-67-7
Ce	0.8	7440-45-1

RN 140418-74-2 HCA

CN Cerium zirconium oxide (Ce<sub>0.9</sub>Zr<sub>0.1</sub>O<sub>2</sub>) (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
=====	=====	=====
O	2	17778-80-2
Zr	0.1	7440-67-7
Ce	0.9	7440-45-1



CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
 Section cross-reference(s): 57, 72, 76

ST zirconia ceria system elec property; fuel **cell** zirconia  
 ceria **electrolyte**; steam electrolysis membrane zirconia  
 ceria; MHD electrode zirconia ceria system

IT **53169-24-7**, Cerium zirconium oxide (CeZrO<sub>4</sub>)  
**140418-71-9**, Cerium zirconium oxide (Ce<sub>0.6</sub>Zr<sub>0.4</sub>O<sub>2</sub>)  
**140418-72-0**, Cerium zirconium oxide (Ce<sub>0.7</sub>Zr<sub>0.3</sub>O<sub>2</sub>)  
**140418-73-1**, Cerium zirconium oxide (Ce<sub>0.8</sub>Zr<sub>0.2</sub>O<sub>2</sub>)  
**140418-74-2**, Cerium zirconium oxide (Ce<sub>0.9</sub>Zr<sub>0.1</sub>O<sub>2</sub>)  
 (elec. properties of)

L58 ANSWER 50 OF 62 HCA COPYRIGHT 2006 ACS on STN

115:12382 Stabilized zirconia solid electrolyte and its manufacture.  
 Iwasaki, Hiroyuki; Ishizaki, Fumiya; Yoshida, Toshihiko; Tagaya,  
 Nobuaki; Mukaizawa, Isao; Seto, Hiroshi (Tonen Co., Ltd., Japan;  
 Petroleum Energy Center). Eur. Pat. Appl. EP 414575 A1  
**19910227**, 9 pp. DESIGNATED STATES: R: BE, DE, FR, GB.  
 (English). CODEN: EPXXDW. APPLICATION: EP 1990-309394 19900828.  
 PRIORITY: JP 1989-217539 19890825; JP 1989-253760 19890930.

AB The solid electrolyte comprises stabilized ZrO<sub>2</sub> particles and <30  
 (0.01-5 wt.%) metal oxide dispersed within grains and/or grain  
 boundaries of the ZrO<sub>2</sub> particles. The metal oxide is Al<sub>2</sub>O<sub>3</sub>, Cr<sub>2</sub>O<sub>3</sub>,  
 mullite, MgO, and/or a rare earth oxide, etc. and the av. particle  
 sizes of the stabilized ZrO<sub>2</sub> and the metal oxide are >1 and <1  
 .mu.m. The solid electrolyte is manufd. by molding and firing a  
 slurry of stabilized ZrO<sub>2</sub> powder and a metal alkoxide or salt. The  
 solid electrolyte has a high mech. strength without lowering the O  
 ion cond., and is used in solid-**electrolyte** fuel  
**cells**.

IT **127860-57-5**, Cerium zirconium oxide (Ce<sub>0.12</sub>Zr<sub>0.88</sub>O<sub>2</sub>)  
 (zirconia stabilized with, solid **electrolyte**, for fuel  
**cells**)

RN 127860-57-5 HCA

CN Cerium zirconium oxide (Ce<sub>0.12</sub>Zr<sub>0.88</sub>O<sub>2</sub>) (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
=====	=====	=====
O	2	17778-80-2
Zr	0.88	7440-67-7
Ce	0.12	7440-45-1

IC ICM H01M008-12

ICS C04B035-48; C01G025-02

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
 Section cross-reference(s): 57

ST zirconia stabilized solid electrolyte manuf; solid

- electrolyte** fuel **cell**; alumina stabilized zirconia solid electrolyte; chromia stabilized zirconia solid electrolyte; mullite stabilized zirconia solid electrolyte; magnesia stabilized zirconia solid electrolyte; rare earth oxide stabilized zirconia
- IT Rare earth oxides  
(zirconia stabilized with, solid **electrolyte**, for fuel **cells**)
- IT Electric conductivity and conduction  
(ionic, of stabilized zirconia solid **electrolyte**, for fuel **cells**)
- IT Fuel **cells**  
(solid-**electrolyte**, performance of)
- IT 555-31-7, Aluminum isopropoxide 13473-90-0, Aluminum nitrate  
(in manuf. of stabilized zirconia solid **electrolyte**, for fuel **cells**)
- IT 64417-98-7, Yttrium zirconium oxide  
(solid **electrolyte**, for fuel **cells**)
- IT 1314-23-4, Zirconia, uses and miscellaneous  
(yttria-stabilized, solid **electrolyte**, for fuel **cells**)
- IT 1302-93-8, Mullite 1304-76-3, Bismuth oxide, uses and miscellaneous 1305-78-8, Calcia, uses and miscellaneous 1306-38-3, Ceria, uses and miscellaneous 1308-38-9, Chromia, uses and miscellaneous 1309-48-4, Magnesia, uses and miscellaneous 1314-20-1, Thoria, uses and miscellaneous 1314-36-9, Yttria, uses and miscellaneous 1344-28-1, Alumina, uses and miscellaneous 1344-57-6, Urania, uses and miscellaneous 13463-67-7, Titania, uses and miscellaneous 116590-73-9, Magnesium zirconium oxide (Mg<sub>0.09</sub>Zr<sub>0.91</sub>O<sub>1.91</sub>) 121130-03-8, Cerium yttrium oxide (Ce<sub>0.85</sub>Y<sub>0.15</sub>O<sub>1.93</sub>) **127860-57-5**, Cerium zirconium oxide (Ce<sub>0.12</sub>Zr<sub>0.88</sub>O<sub>2</sub>)  
(zirconia stabilized with, solid **electrolyte**, for fuel **cells**)
- L58 ANSWER 53 OF 62 HCA COPYRIGHT 2006 ACS on STN
- 89:200319 Studies of zirconia-ceria base ceramic for MHD channel electrodes. Telegin, G. P.; Romanov, A. I.; Akopov, F. A.; Gokhstein, Ya. P.; Keler, E. K.; Borodina, T. I.; Bakunov, V. S.; Schneider, S.; Rossing, B.; et al. (USSR). U.S.-U.S.S.R. Colloq. Magnetohydrodyn. Electr. Power Gener., [Proc.], 3rd, Issue CONF-761015, 357-77. NTIS: Springfield, Va. (English) **1976**  
. CODEN: 38ABAY.
- AB The results obtained with ZrO<sub>2</sub>-(18-75) CeO<sub>2</sub>, ZrO<sub>2</sub>-78 CeO<sub>2</sub>-2 Ta<sub>2</sub>O<sub>5</sub>, and ZrO<sub>2</sub>-12 CeO<sub>2</sub>-3 mol% Y<sub>2</sub>O<sub>3</sub> are reported. Elec. cond., thermal cond., thermal diffusivity, thermal expansion, thermal stability, and the V-A characteristics were detd. The electrode compns. were also tested in a magnetohydrodynamic (MHD) channel at the operation mode of: plasma temp. 2573 K, combustion product mass flow rate 0.75

kg/s, static pressure 0.83 atm, K concn. in the plasma 1%, electrode surface temp. 1983 K, and total operating time 127 h. Decompn. of the solid solns. occurred in both the cathodes and the anodes and was esp. notable in electrodes not under current. The major decompn. products are discussed.

IT **12157-80-1P**

(formation of, in ceria-zirconia ceramic magnetohydrodynamic electrode)

RN 12157-80-1 HCA

CN Cerium zirconium oxide (Ce<sub>2</sub>Zr<sub>2</sub>O<sub>7</sub>) (8CI, 9CI) (CA INDEX NAME)

\*\*\* STRUCTURE DIAGRAM IS NOT AVAILABLE \*\*\*

CC **52-2** (Electrochemical, Radiational, and Thermal Energy Technology)

Section cross-reference(s): 57, 69

IT **12157-80-1P** 68335-81-9P

(formation of, in ceria-zirconia ceramic magnetohydrodynamic electrode)

L58 ANSWER 55 OF 62 HCA COPYRIGHT 2006 ACS on STN

82:37721 Measurement of the oxygen ion transport number in

**oxygen ion-electron** mixed conductors. Suzuki, Yutaka; Takahashi, Takehiko (Fac. Eng., Nagoya Univ., Nagoya, Japan). Denki Kagaku oyobi Kogyo Butsuri Kagaku, 42(9), 467-71 (Japanese) **1974**. CODEN: DKOKAZ. ISSN: 0366-9297.

AB The polarization resistance (R<sub>l</sub>) at the electrode was considered in constructing an equiv. circuit for the O concn. cell with a solid state mixed conductor. The electronic resistance R<sub>e</sub> was in parallel with the potential of the idealized cell E<sub>th</sub>, ionic resistance R<sub>i</sub> and R<sub>l</sub>. Therefore R<sub>e</sub> was obtained by applying the blocking voltage E<sub>th</sub>. Furthermore R<sub>i</sub> was divided into the pure ionic resistance R<sub>3</sub> and the grain boundary resistance R<sub>2</sub>. Both R<sub>l</sub> and R<sub>2</sub> possess capacitances in parallel. By measuring the total impedance of the cell from 20 Hz to 20 KHz, each resistivity was detd. independently. The ion transference no. t<sub>i,1</sub> thus detd. was independent of the electrode conditions or electrode materials, while that detd. by single open circuit voltage measurement was nonreproducible. Various solid solns. of **ZrO<sub>2</sub>**, ThO<sub>2</sub> and **CeO<sub>2</sub>** were used as the mixed conductor and variously heat treated electrodes of Pt, Ag and Au were examd.

IT **1306-38-3D, Cerium oxide (CeO<sub>2</sub>**

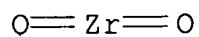
), solid soln. with oxides **1314-23-4D, Zirconium oxide (ZrO<sub>2</sub>)**, solid soln. with oxides (oxygen ion transport no. in)

RN 1306-38-3 HCA

CN Cerium oxide (CeO<sub>2</sub>) (8CI, 9CI) (CA INDEX NAME)



RN 1314-23-4 HCA  
CN Zirconium oxide (ZrO2) (8CI, 9CI) (CA INDEX NAME)



CC 76-2 (Electric Phenomena)  
IT **1306-38-3D, Cerium oxide (CeO2**  
) , solid soln. with oxides 1314-20-1D, Thorium oxide (ThO2), solid  
soln. with oxides **1314-23-4D, Zirconium**  
**oxide (ZrO2)**, solid soln. with oxides  
(oxygen ion transport no. in)